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Improved Gun Carriage.

The saving of human life is of the utmost importance at all times; but more particularly where great issues depend upon the existence of certain persons; as in battle, where the fortunes of the day may turn upon the ability of the artillerists to hold a designated point on the field. Sharp-shooters are so universally employed by all nations at the present day, and they are so efficient, that gunners especially, within range, are very soon picked off, and their pieces consequently disabled. To prevent such a contingency as far as possible, the revolving shield represented in the accompanying engravings has been invented, to screen the artillerist from danger; and every one will concede that the principle of the shelter is perfectly correct. The inventors description of his machine is here appended.

Fig. 1

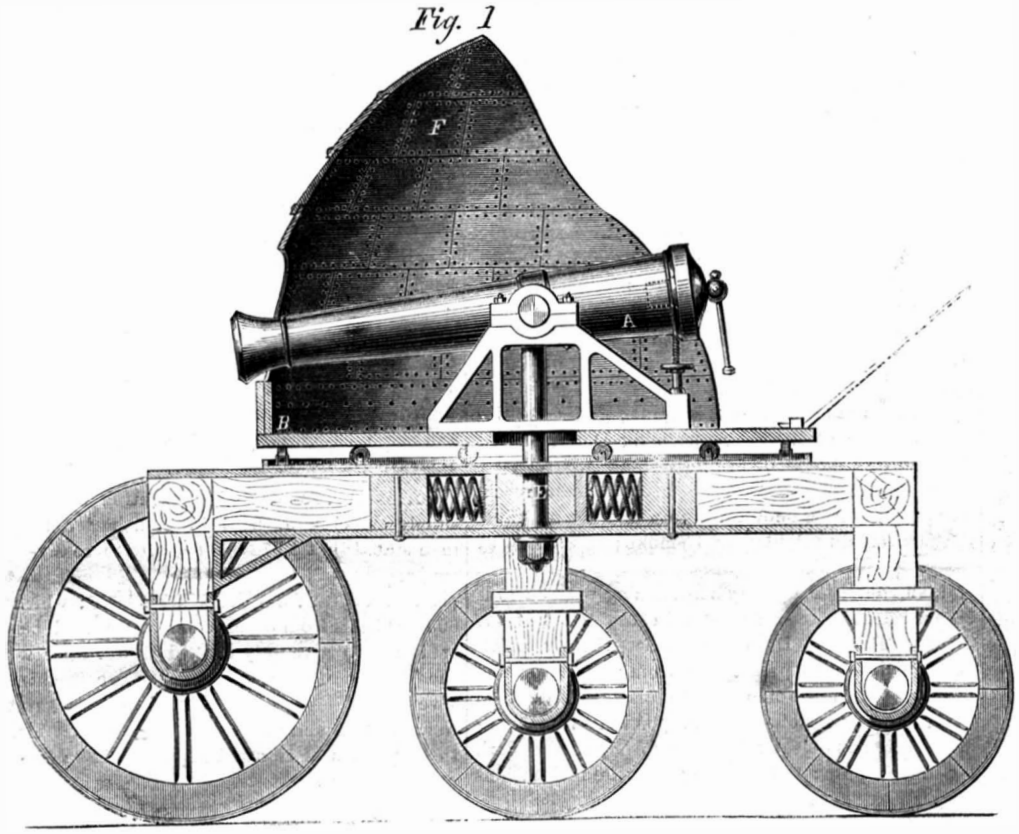
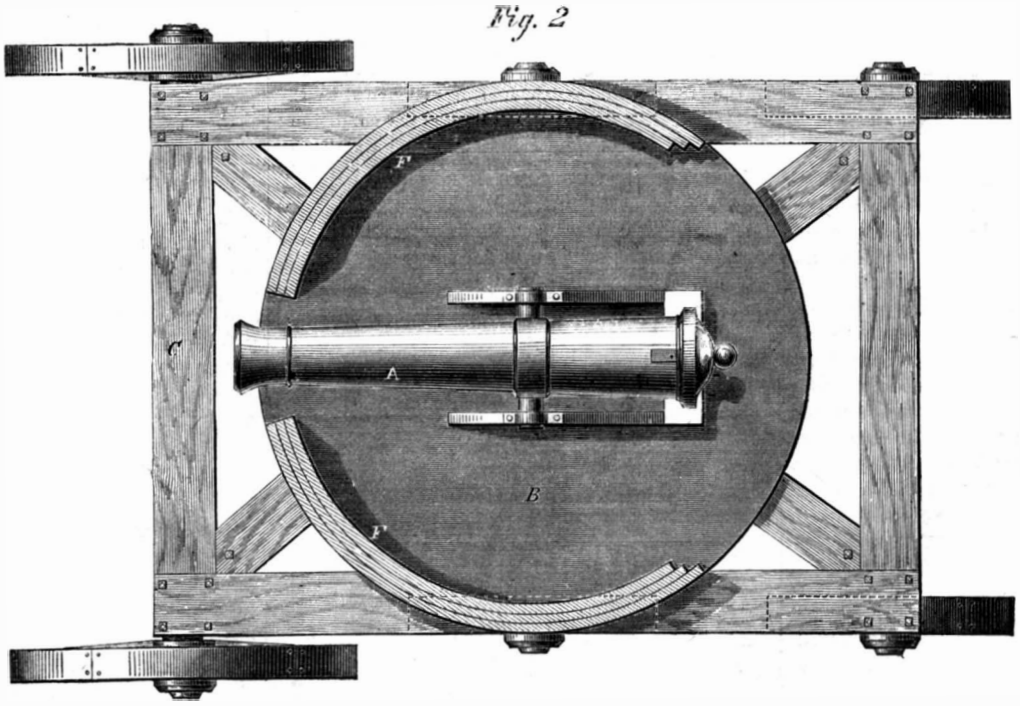


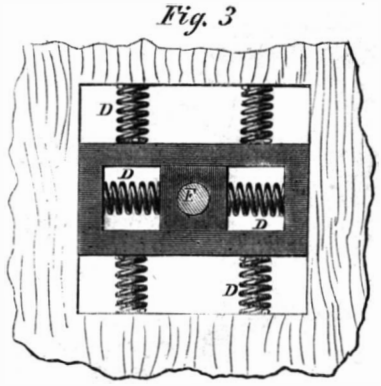
Fig. 2



DE MEY'S REVOLVING SHIELD GUN CARRIAGE.

The advantage of this improvement is, that the gun can be brought into action, the horses withdrawn, and the gunners protected from the fire of the enemy, by means of a shot-and-shell-proof shield. Even were the carriage in motion, the gun can be fired, which is a great advantage for an army in pursuit of a retreating enemy. The gun, A, is placed on a turn-table, B, which is mounted on solid friction rollers, on an ordinary carriage, C. These friction rollers run on a smooth wrought-iron ring screwed to the carriage, so that the gun and shield on the turntable may be moved in any direction with facility, by means of a hand-spike. The gun is attached to a box of strong springs, D, seen in an enlarged form in Fig. 3, which move in any direction through the medium of the pivot, E, and take up the recoil of the piece effectually. The shield, F, is attached to the turn-table, B, and of course moves with it; and is

Fig. 3



pointed to its position by moving the turntable with an ordinary hand spike in any direction, so that, no matter from what quarter the assault is made, the shield will readily turn so as to repel the foe. The effect of such a shield as this would be salutary upon the nerves of the gunners, if in no other respect, as it would enable them to aim their piece with great confidence, relying upon the impenetrability of the iron to protect them.

The gun is a breech-loading (8 inch howitzer), and it will be easily seen that both during the processes of loading and firing the gunners are fully protected. The cost of the shield, carriage, turntable and appurtenances, without the gun, will be about $850. The weight of the shield, carriage, turn-table, &c., without the gun, will be about 2,500 lbs.

This invention was patented on Sept. 16, 1862, by F. A. De Mey, of Brooklyn, L. I.; further information may be had by addressing Chas. Sholl, Civil Engineer, 77 Cedar street, New York, room 23.

WAS FORT SUMTER INJURED.—"Of the fact that Fort Sumter was on the point of surrendering," says an exchange, "when the *Monitors* were called out of action, we know that the President and the Secretary of the Navy have most convincing proof. They have letters from those who saw the holes through the walls, from those who walked through the breaches, and from those who, living in Charleston, gave the assurance that a *cart and horse could be driven through them!*"

Pretty convincing testimony.

A NEW class of six-wheel express engines are building at London, which are to have 17-inch cylinders, and 4 coupled wheels, 7 feet in diameter.

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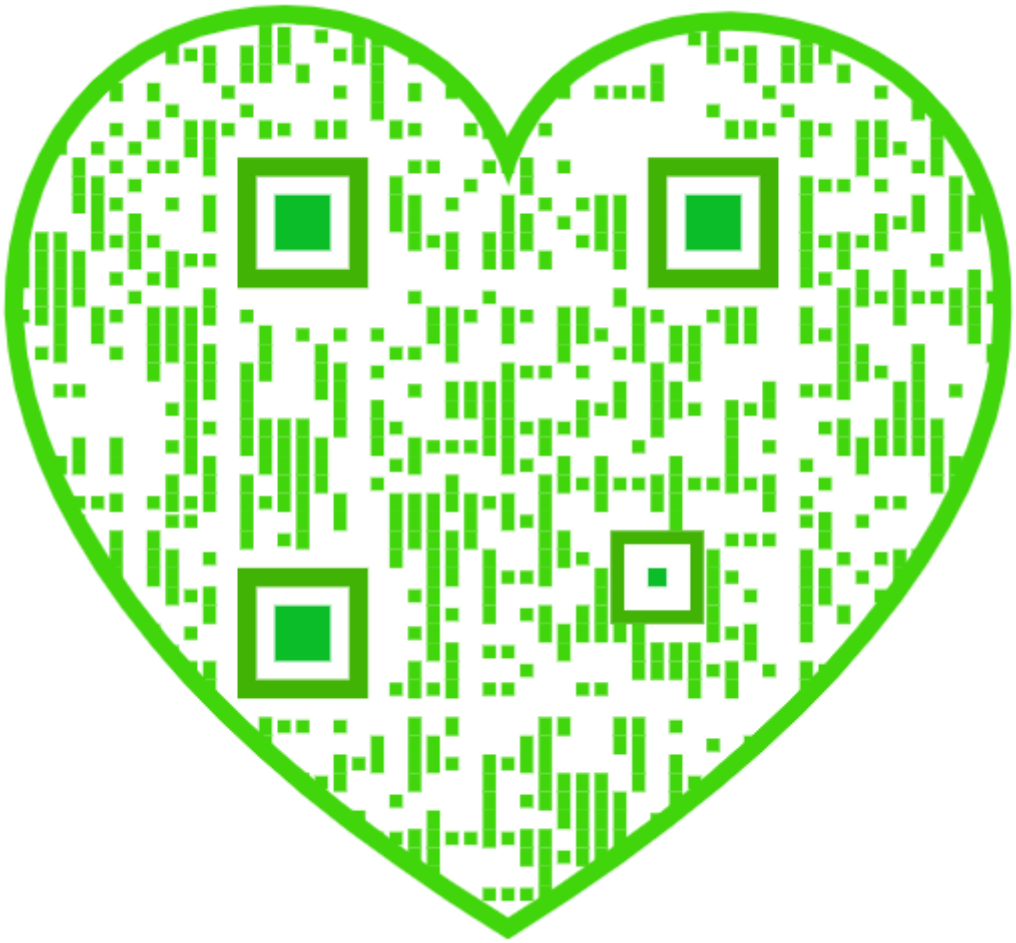

MANUFACTURE OF ULTRAMARINE.

The blue pigment known as ultramarine, was formerly the product of a mineral, which, on account of its beauty, was also employed as a gem in jewelry. Being obtained in a few countries only, as an agent of painting it was very costly; but now—thanks to the great improvements made in synthetical chemistry—it is produced artificially at quite a moderate price. It is chiefly manufactured in the chemical establishments of Germany; and the composition and processes involved are described as follows, in *Dinglers Journal*:—

"The composition for a dark aluminous ultramarine consists of 100 parts of slightly burned kaolin (porcelain clay), 90 parts of soda-ash (95 p. c.), 100 parts of refined roll sulphur, 6 parts of rosin, and 4 of dry pine charcoal. Each of these ingredients is powdered, with the exception of the rosin, which is only added in pieces the size of a walnut when the materials have been mixed, and the whole is rolled together for the space of four hours. It then forms a smooth gray powder, and is loosely packed into fire-proof boxes, which are covered up, properly luted, and placed on the lower floor; and after closing up all the apertures of the furnace, it is rapidly brought to a point of temperature equivalent to the fusing point of an alloy of equal parts of gold and silver, at which temperature the oven is kept for from five to six hours. By means of small tubes inserted in the front of the furnaces, the process is watched: samples being taken from time to time, by means of hollow cylinder screws. When these samples remain of a green color on cooling, the fire is gradually slackened, and afterwards the draught is shut off; the furnace being left to cool for 28 hours. Two days afterwards the mass is removed from the boxes. It is first broken up under mill-stones, then finely powdered, filled into cast iron annealing boxes ($1\frac{1}{2}$ feet high, 2 feet long, and $1\frac{4}{6}$ feet wide on top, somewhat narrower in the bottom, the iron $\frac{1}{5}$ of an inch thick), the covers of which overlap the sides. These boxes are placed on the upper floor of the furnace, at the same time that a fresh charge is placed on the lower floor; and are removed about twelve hours after the firing has ceased. This annealing or coloring, which changes the green to blue, by partly oxidising, and partly removing an excess of sulphur, is similar to the process of coloring red-lead.

"The blue pigment now obtained is lixiviated, and then, while moist, ground between granite or quartz millstones. When the desired fineness is obtained, the pulp is run into draining bags, and afterwards put in cast-iron dishes. which are also placed in the upper floor of the furnaces to dry, whenever the iron annealing boxes have been removed. On the Rhine, some factories are supplied with reverberatory furnaces, the soles of which are heated from below by the fire, which then again passes over the charge before reaching the flue. Such furnaces hold as much of the crude materials as will yield about 1,300 pounds of ultramarine.

"Another method consists in mixing the materials in smaller quantities, and forming them into batches, in boxes containing only about 700 pounds each. These boxes are placed in pairs on the benches of a double floor reverberatory furnace, constructed after the manner of a smalt furnace, heated by one fire, which first passes around the boxes on the lower floor, and from underneath them to the upper floor. The masonry of the lower floor is fire-brick, the supports of both soles and arches being stone, and the upper floor is formed of iron plates. The boxes are made from fire-proof tiles, one inch thick, grooved and let in at the edges. The fuel used is bituminous coal."

A Testimonial.

MESSRS. MUNN & Co.—I received my patent papers from Washington yesterday, and am much pleased with them, they being very accurately prepared. The drawings are superbly executed. I had rather give you five times your price, than have them prepared by inexperienced persons—as a thing worth doing is worth doing well. I shall cheerfully recommend you, as honorable and reliable patent attorneys, and worthy the confidence of inventors who wish their rights protected.

ALEX M. BRISTOL.

Detroit, Mich., July 14, 1863.

Scientific Paradoxes.

The water which drowns us—a fluent stream—can be walked upon as ice. The bullet which, fired from a musket, carries death, will be harmless if ground to dust before being fired. The crystallized part of the oil of roses—so graceful in its fragrance—a solid at ordinary temperatures, though readily volatile—is a compound substance, containing exactly the same elements, and in exactly the same proportions, as the gas with which we light our streets. The tea which we daily drink, with benefit and pleasure, produces palpitations, nervous tremblings, and even paralysis, if taken in excess; yet the peculiar organic agent called theine, to which tea owes its qualities, may be taken by itself (as theine, not as tea) without any appreciable effect. The water which will allay our burning thirst, augments it, when congealed into snow; so that Capt. Ross declares the natives of the Arctic regions "prefer enduring the utmost extremity of thirst, rather than attempt to remove it by eating snow." Yet if the snow be melted, it becomes drinkable water. Nevertheless, although, if melted before entering the mouth it assuages thirst like other water, when melted in the mouth it has the opposite effect. To render this paradox more striking, we have only to remember that ice, which melts more slowly in the mouth, is very efficient in allaying thirst.

Sights and Sounds of War.

The City Hall Park opposite our office presents a vivid picture of the actualities of war. Since the riots occurred, it has been tenanted by batteries of artillery, and companies of cavalry and infantry. These latter drill regularly in the morning, and the "spirit-stirring drum, and ear-piercing fife" are sufficiently audible. Tired artillerymen lay stretched upon the ground beside their guns; gaunt cavalry horses—some of them far outvieing Don Quixote's Rosinante in point of leanness—look wistfully toward trusses of hay that lay beyond their reach. The guard paces monotonously up and down; those that are off duty lounge and smoke; and a motley group of idlers, apple-women, and citizens in general, surround the encampment, gazing with curious eyes upon this scene, so novel in the heart of the great metropolis. Even as we write, the air is full of martial sounds proceeding from the camp; and squads of men are moving to and fro, intent on duty. The peaceably-disposed portion of the community do not object to the occupancy of the Park for this purpose; but others of opposite inclinations are loud and voluble in their indignation.

Shocking Accident.

A terrible accident occurred on the 21st inst., by which a number of persons, mainly children, lost their lives. A part of the wall of the Police Station in the 18th ward, which had been burned by the rioters, was left standing in a dangerous condition; and at the time of the accident, a large number of women and children were in the ruins, busily searching for coal which was said to be buried there. A high wind prevailed, and those beneath the dangerous portion of the building were warned to fly while they had time. Several did so, but others remaining were crushed by the bricks which fell with terrific force. A large number, estimated at twenty children, and grown people, were buried; and up to this time only eleven bodies have been exhumed.. It is thought that others will be found as the investigation proceeds. The spectacle is said to have been shocking, at the time the wall fell in; and many women fainted who witnessed it.

Californian Woolen Goods.

About two years ago the California Pioneer Woolen Factory, situated near Black Point, was totally destroyed by fire. The losses were very great, but the company re erected the building, provided it with more expensive and serviceable machinery than before, and now turn out handsome and durable goods. The new building is of brick, 242 by 50 feet. There are four artesian wells, which with other means, supply abundance of water. An 80 horse power engine, from Donahue's Foundry, consuming three and a half tuns of Mount Diablo coal per diem, moves the machinery. About fifty-five hands are employed, a few of whom are females, and a number of them Chinamen. About 500,000 pounds of wool are used yearly. The products are coatings, cassimeres, flannels and blankets. The finest quality of blankets made command $14 per pair, and the cheapest $3 per pair.

MISCELLANEOUS SUMMARY.

AMERICAN ART IN ENGLAND.—The London *Times* says: "The reputation of Mr. Church, the most eminent American landscape painter, has been brought to this country by his 'Niagara,' and 'Heart of the Andes.' His pictures of 'Icebergs off the Coast of Labrador,' now exhibited at the German Gallery, will enhance the estimation of Mr. Church with those who have seen his former pictures, and affords an excellent opportunity for those who have not, to form a conception of what landscape painting in the United States is aiming at and achieving. . . . The picture altogether is a noble example of the application of the landscape painter's art to the rendering of grand, beautiful, and unfamiliar aspects of nature, only accessible at great cost of fatigue and exposure, and even at peril of life and limb; which seems to be one of the walks in which this branch of the art is destined to achieve new triumphs in our time. All who can honor and appreciate the art, in this new and arduous development of it, should see Mr. Church's great picture."

THE Michigan Southern Railway Company have ordered six new 30 tun locomotives to be made with all dispatch, also a large number of freight cars, as both their motive power and rolling stock are inadequate to the demands upon them. A late number of the Toledo *Commercial* reports about 200 cars of the Michigan Southern Railroad standing on the track at the depot, filled with grain, goods, &c., which could not be unloaded, because of no store rooms, and there being no propellers in port to transport their freight away.

COTTON SUPPLY.—At a late meeting of the cotton supply association, held in Manchester, the chairman stated that 1,072,000 bales were received from India in 1862; and that 1,200,000 bales were expected this year from the same source; which with 600,000 bales from other countries, would be about sufficient to give only three days work per week to the English cotton operatives. The machinery in several factories has been altered to work surat cotton; but American cotton is so superior, that three pounds of it can be spun in the same time as one pound of surat.

THE great bridge over the Susquehanna river, at Columbia, Penn., which was destroyed by fire on the 28th ult., was constructed in 1834, and cost $157,000. It was 5,020 feet long, 14 feet above high water, built all of wood, and about 40 feet wide; comprised 28 spans, resting upon stone abutments; was covered; roof above roadway, 25 feet; had two tracks also, used for vehicles and foot passengers, and tow paths, the latter for the Susquehanna and Tidewater Canal.

PACIFIC HARVESTING MACHINERY.—The California *Farmer* says:—The sale of harvesting machinery has never been so great as in the present year. The number of implements that have been sold by the several dealers is beyond any precedent. At San Francisco, they refer with just pride to the several agricultural warehouses in the city, where the assortment of agricultural implements is equal to that found in any part of the world.

MESSRS. J. Z. & C. Goodrich, at Glendale, Mass., are now running their woolen mill, on satinets and melton cloths. They have 60 looms, which, until recently, ran night and day for six months, on a large contract for A. T. Stewart & Co., of this city. There are 7 sets of cards in the mill, and from 10,000 to 12,000 yards of goods are produced in a week. At present there is a great scarcity of help.

THE long submarine line of telegraph between Malta and Alexandria has not been working for several weeks. The cable is supposed to have been broken by the anchor of some vessel.

THE manufacture of Armstrong guns is now entirely suspended at the Royal Arsenal, England

THE original MSS. of Gray's "Elegy" was recently sold in England for $500.

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THE EXPANSIVE WORKING OF STEAM.

The ultimate quantity of mechanical power which theory assigns to steam is so great, that there is something tantalizing in comparing therewith the dynamical results attained by even our very best engines. Theory, of course, prescribes an infinite pressure, and an infinite degree of expansion. As a practical approach to such a pressure, we have the legend of Alban, the German doctor, who sent his steam upon the piston at 1,000 pounds per square inch. This was done, too, here in London; and although the performance was for no great space of time, it is not recorded that any one was blown up. Now, to obtain the greatest effect, theoretically at least, from steam, of whatever pressure, it is necessary to work it in a condensing engine, and to condense down to a perfect vacuum. Let us suppose, then, that steam of a total pressure of 1,000 pounds per square inch, as measured from a vacuum, is expanded to a final pressure of one-tenth of a pound only per square inch, as measured above the same *datum*. Here the expansion is ten thousand fold; and if the temperature of the steam be maintained during expansion by superheating or steam jacketting, the effect or power obtained will be 10·21 times greater than if the same weight of steam were worked without expansion. Thus, if an engine work, without expansion, with 5 pounds of coal per hourly indicated horse power, the rate of expansion just considered should result in a consumption of 49 pounds of coal only for the same effect, this quantity being exclusive, however, of that required to maintain the heat of the steam during expansion But, if we could impart even three-fourths of the full heating value of good coal to the water in steam boilers, we should, upon the same theoretical consideration, attain to a still greater degree of economy. Thus a pound of good coal gives off in combustion as much heat as would raise 16,000 pounds of water through a temperature of 1°, or more than enough to raise 13 pounds of water of ordinary temperature into very high-pressure steam. If, then, we attained an ordinary rate of evaporation of 10 pounds of water per pound of coal, we should be working with say 3 pounds of coal per hourly indicated horse-power, with condensation and without expansion; and, with the allowance already mentioned for maintaining the temperature of the steam during expansion, with hardly more than a ¼ pound per horse-power, with an expansion of ten thousand fold. This would be a tolerably close approach to the theoretical economy of heat as referred to Joule's equivalent. For if we obtain from a pound of coal, say 12,000 "units of heat," or, in other words, as much heat as would suffice to raise 12,000 pounds of water through 1°, or 10 pounds of water through 1,200°, then the mechanical power represented by each unit of heat being 772 foot-pounds, the corresponding total power represented by a pound of coal (even when but three-fourths of its total heating power is calculated upon) is 9,264,000 foot-pounds, equal to $\frac{9264000}{1980000}$=4 67 hourly horse-power, corresponding to 0·214 pounds of coal nly per indicated horse-power per hour.

Ever one conversant with the theory of steam must have made calculations of the nature just illustrated; and it is possible that, in some instances, the whole theory has been denied because of the apparent impracticability of attaining anything approaching such results in practice. Watt understood the advantage of condensation, and the general theory of expansion; but with steam of very low pressure, his engines required from 7 pounds to 10 pounds of coal per actual hourly horse-power; a result attributable, in a great measure, no doubt, to imperfect workmanship. Now, however, marine engines worked with steam of less than 25 pounds pressure, are going by the month together, with only 2 pounds per horse-power; and it is therefore reasonable still to look for a gradual improvement even upon this economical rate of consumption. In the manufacturing districts, and indeed, generally, upon land, extreme economy of fuel is not of such great consequence; but for steam vessels it is everything. In many parts of the world coal costs £3 and upwards a tun, but even this does not stand so much in the way of economical steaming, as the very weight of the coal required to be carried, and of the boilers and engines themselves; the total weight of coal and machinery being so great as to preclude the profitable conveyance of cargoes on long voyages. The largest transatlantic steamships (not referring to the *Great Eastern*) leave port with 1,400 tuns of coal on board, while the weight of their engines and boilers, in working trim, is nearly as much more. If half the weight and cost of the coal could be saved, and space and displacement corresponding to 1,000 tuns could be liberated for the conveyance of merchandise, how different would be the result commercially. Such a saving is likely, however, to be soon generally effected, for the mechanical and commercial practicability of driving a 3,000-tun ship, at a mean speed of 13 knots, with, at most, 60 tuns of coal in 24 hours, has been virtually established, by the practice of the Peninsular and Oriental Company. The machinery by which this is effected is, however, costly and very heavy, although the increased weight of the engines is in a great measure offset by the diminished number and weight of the boilers; while a great saving of bulk and displacement in coal-bunkers remains as net gain, irrespective of the money saving in the diminished consumption of coal itself.

As far, then, as economy of fuel is concerned, very good results are already obtained with steam of from 20 pounds to 25 pounds, moderately superheated, and with surface condensation; but a further advantage remains to be obtained from steam, by higher pressure and an increased speed of piston. A good high-pressure marine boiler would, it might be supposed, be now forthcoming, since the extensive introduction of surface condensers supplying distilled water.

While dealing with expansive working, it will not be inappropriate to say a few words as to indicator diagrams from expansive engines. It is easy to set out a theoretical expansion curve for any point at which the steam is cut off, allowing also for the loss of pressure due to expansion. For those who do not care to calculate the ordinates, or refer to hyperbolic logarithms, there is (if not out of print), a very convenient diagram by Mr. Charles Cowper, published by Weale, from which any one may lay down a theoretical expansion diagram. This diagram was published as long ago as 1849, and yet it carefully allows for the loss of pressure during expansion; a loss which, indeed was pointed out by Oliver Evans, as early as 1805 But no theoretical expansion diagram will agree with that obtained in practice frem the indicator, when cutting off at the same point in the stroke; nor will the indicator diagram, in many cases, afford an accurate representation of the work really obtained from the steam used. For in the case of unprotected cylinders, with a long stroke and a slow speed of piston, the internal cooling is sometimes so great that as much steam is condensed on entering the cylinder as appears on the diagram. Between two and three years ago, a "board" of American naval engineers made a series of experiments to ascertain whether there was any gain (!) in expansion; and they confined their observations to a condensing engine, having an unjacketted cylinder with an 8 feet stroke, the piston in some of the experiments making but eleven double strokes, or 176 lineal feet per minute. In cutting off at about one-third stroke, it was found that as much coal was burnt per horse-power as when following full stroke, and it was eventually decided, we believe, that there was no gain in expansion! Fortunately, however, the water fed to the boiler was measured; and by referring to the relative volume of the steam thus generated at the working pressure, it was found that about 40 cubic feet of steam was admitted at each stroke, into a space which, but for internal condensation, could have received but 20 cubic feet. The fact was that after the steam was cut off, the interior of the cylinder was so long exposed to a falling temperature—sinking at last to 100° when the communication was open to the condenser—that the inner surfaces of the bore lost a great deal of heat, and on the admission of steam of 250° and upwards on the return stroke, a great deal was condensed. If moisture once forms upon a metallic surface, the abstraction of heat from that surface in vaporising such moisture, is very rapid; but if the steam were kept dry, and the cylinder were heated to above its normal temperature, the mere internal radiation of heat into such dry steam, even at the temperature of condensation, would have been very slight indeed. A slight return for the heat actually taken from the cylinder at each stroke was, of course, made in the re-evaporation of precipitated moisture; but as most of this re-evaporation must have taken place while the cylinder was open to the condenser, the return was indeed slight. In many cases such re-evaporation is the source of an additional loss, by occasioning back pressure.

Priming, it is almost needless to say, will greatly affect the shape of a diagram. For water coming over with steam, and having a heat of, say 300°, quickly evaporates when the pressure by which it is surrounded has fallen to a point corresponding to 200° or less.

The leakage of valves also affects the shape of indicator diagrams, the extent of this influence being necessarily beyond any means of precise estimation. It is practically impossible to fit two flat surfaces of cast-iron so accurately together that, without ports or openings in either, they will move less easily with steam of great pressure upon them than in the open air.

In dealing with expansion also, it is very commonly assumed that, if the steam be cut off when the piston has made say one-fourth of its stroke, the expansion is necessarily four-fold. It sometimes happens, however, that the space in the steam ports and clearances at the end of the stroke is nearly equal to that included in the portion of the stroke of the piston for which dense steam is admitted. Thus, with an admission for one-sixth of the stroke, if the clearances, ports, &c., contained an amount of steam equal also to one-sixth of the stroke, one half of the effect of the steam, as measured before expansion commences, is lost, and the expansive effort is that only due to an admission for two-sevenths of the stroke: or only a little more than one-third, were there no other losses.

In these, and in other ways, the practical result of expansion differs considerably from that assigned by theory alone, and supposing no special circumstances to be taken into account.—*The Engineer* (*London*).

Great International Wheat Show.

A great International Wheat Show will be held at Rochester, N. Y., September 8th, 9th, and 10th, under the auspices of the Monroe County Agricultural Society. The following premiums are offered:—

For the best 20 bushels of white winter wheat..	$150 00
For the second best 30 bushels of white winter wheat.....	75 00
For the best 20 bushels red winter wheat.....	100 00
For the second best 20 bushels red winter wheat	50 00
For the best 2 bushels white winter wheat.....	50 00
For the second best 2 bushels white winter wheat	25 00
For the best 3 bushels red winter wheat.....	40 00
For the second best 2 bushels red winter wheat	20 00
For the best 2 bushels spring wheat.....	20 00
For the second best 2 bushels spring wheat....	10 00

Competitors for these prizes will be required to furnish samples of the wheat in the ear, and with the straw attached (say fifty ears of wheat and straw); also to furnish a written statement of the nature of the soil on which the wheat grew, method of cultivation, time of sowing, quantity of seed sown, manures (if any used), and mode and time of application; also the time of ripening and harvesting, and the yield per acre, with such other particulars as may be deemed of practical importance; also the name by which the variety is known in the locality where it was grown. The wheat must be one variety, pure, and unmixed. The prize to be awarded to the actual grower of the wheat, and the wheat which takes a prize to become the property of the society.

LOCOMOTIVES AND STEEP GRADIENTS.—The power possessed by locomotives to surmount steep gradients has been lately demonstrated in a very remarkable manner, by the opening of the Bhore Ghaut incline of the Great Indian Railway. The incline attains at one long lift the great hight of 1,832 feet, which is the highest elevation hitherto attained by any railway incline. It is fifteen and a half miles long, and the average gradient consequently is 1 in 46·39.

MANUFACTURE OF GLASS.—The first glass manufactory established in California recently commenced operations at San Francisco. About thirty men and boys are at present engaged in the works—bottles being the chief articles of manufacture. All the materials required, excepting soda ash, are obtained in the State.

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THE CHEMISTRY OF ANIMAL SUBSTANCES.

[Concluded from page 52.]

FIBRIN.—In the common glutin of wheat there is another substance called fibrin, which is similar in its chemical properties to the fibrin in the blood of animals. It is obtained by agitating the fresh blood of animals with a twig, to which it adheres in the form of fibrous filaments, and which may be cleansed by washing in water. When removed from the living animal, it possesses the power of spontaneous coagulation, and becomes insoluble. When washed and dried, it is translucent and horny. According to Dumas, water containing only a millionth part of hydro-chloric acid gelatinizes fibrin; and if a few drops of gastric juice are then added to it, the whole will dissolve the fibrin at a temperature of 96° to 100° Fah. This fact may have some bearing on the theory of digestion.

GELATIN.—This principle is widely diffused in the animal kingdom. It exists ready formed in the skin, and is obtained for manufacturing purposes from the clippings of hides, and the legs and feet of cows, calves, and sheep. When these are cleansed in cold water, and afterwards subjected to boiling, the muscles, &c., dissolve, forming a jelly, which when cut into slices and dried, forms gelatine. This substance when obtained from fish, is called isinglass. It is used in large quantities as an article of food in Russia; where it is prepared from the air bladders and roe of the sturgeon. These bladders are cleansed, dried, and scraped, to separate the external and internal membrane; and, without further preparation, the residue forms leaf isinglass, which is then cut into filaments by a machine to prepare it for sale. It is soluble in hot water, after a short period of maceration in cold water. A very pure form of gelatin is manufactured from the cuttings of the skins of calves, by cleansing them from fat, &c., in lime water, then in cold water, and digesting them in clear water heated to 200° Fah. The gelatinous liquor thus obtained is then strained through flannel, and allowed to cool to a proper consistency; after which it is poured upon a marble slab. When nearly set, it is transferred to an open network, and dried in a covered shed, exposed to the air passing through lattice work. It is subsequently damped, rolled into thin sheets, and afterwards cut into shreds. Gelatin is also obtained from ground bones, by submitting them to water at a temperature of 250° Fah., under pressure. This kind has generally a disagreeable odor.

From whatever source obtained, pure gelatin is colorless, transparent, inodorous, and insipid. In cold water it softens and swells, but scarcely dissolves until heated. Its solubility in hot water distinguishes it from fibrin and albumen. When subjected to destructive distillation, it yields carbonate of ammonia, and leaves carbon in the retort. In solution, it is very subject to putrefaction during warm weather; but a little acetic acid, or creosote, retards decomposition. Gelatin is soluble in all dilute acids. The action of strong sulphuric acid upon it produces leucine, and a peculiar saccharine product, called glycocine, or gelatin sugar. When boiled with caustic potassa, ammonia is evolved; and leucine and gelatin sugar are also formed. A solution of alum and common salt unites with gelatin, and forms an insoluble compound called "tawed leather." This also is the solution used for preparing white sheep-skins. Tannic acid, which is derived from nutgalls, oak, and hemlock bark, &c., unites with gelatin, producing an insoluble compound; which in the form of hides constitutes leather. Gelatin and tannic acid unite in nearly equal parts, constituting tanno-gelatin. The albumen in skins also unites with tannin, and forms an insoluble compound known as tannate of albumen.

Leucine is a white substance, obtained by boiling gelatin in sulphuric acid diluted with four parts of water. It is also obtained from the fibrin of muscle, from glutin, and other nitrogenous principles. Glycocine, or gelatin sugar—which is produced by boiling gelatin in dilute hydro-chloric acid—has a sweet taste; but differs from common cane and grape sugar, in not undergoing vinous fermentation.

The three nitrogenous principles—albumen, fibrin, and casein—are the constituents of animal food, and substances precisely similar in nature are found in the vegetable kingdom. In a chemical sense, therefore, there is not that broad distinction between animal and vegetable food which some persons have imagined. The constituents of flesh exist in vegetables, from which the flesh of the herbivora is formed. These principles pass into the blood through the chyle, which is the liquid product of digested food. Gelatin is not found in the blood, but is formed from it in the living organism. The human body can only be properly nourished by a variety of food, to suit the varied character of its textures. At one period a theory was extensively accepted, that the body could be supported by any one of the nitrogenous principles, excepting gelatin; but upon due investigation, a commission of the French Academy reported that neither man nor animals should be restricted to food which did not contain all the proximate principles of their entire bodies. The four nitrogenous principles—albumen, fibrin, casein and gelatin—under the influence of life-force, or vitality, appear to be convertible into each other. This is proved to some extent by the process of incubation. A recently laid egg contains only liquid albumen and oil. But when incubation is complete, fibrin and gelatin are found in the muscles and soft parts of the young bird; and a large proportion of the soluble albumen has passed into the insoluble state. Casein, as contained in milk, is convertible in the living body into the other principles.

The constitution of gelatin is represented by the formula C13 H10 O5 N2. It contains no sulphur. The size used by painters and gilders is gelatin, made chiefly from cuttings of parchment. Chondrin is a peculiar variety of gelatin, and is found in cartilage, the wind-pipe, the cornea of the eye, and at the ends of the long bones. Its formula is C32 H26 O14 N4. The soft solids of animals are chiefly formed of albumen, fibrin, and gelatin.

Fibrin enters largely into the composition of muscle or flesh, forming about 22 per cent of it. Muscle also consists of cellular tissue (albumen), nerve and fat. By analysis, dry muscle yields the same elements as those of blood. The juice of flesh is always acidulous; and the nitrogenous principles exist in it. These can be separated by a complex process; and are found to be definite compounds, composed of the same elements combined in different proportions.

Albumen enters into the composition of muscle, the brain, spinal cord, and nerves. It is a constituent of cellular tissue; and of the soft organs, such as the liver, spleen, lungs, and kidneys. The substance of the brain consists of 80 per cent water, with 7 per cent of soluble albumen, cerebric—a white fatty acid—and oleophosphoric acid—an oily liquid. The waxy secretion of the ear (cerumen) is a compound of albumen with an oily substance, and a yellowish resin, soluble in alcohol.

Gelatin enters into the composition of the skin, tendons, ligaments, and the white fibrous tissue generally; as well as into horn, cartilage, ivory, and the teeth. In 100 parts of dry human bone there are 33.3 of organic matter—gelatinous tissue—and 66.6 parts of earthy matter, consisting chiefly of sub-phosphate of lime, carbonate of lime, and phosphate of magnesia. The quantity of earthy matter in the bones increases with age. In childhood it amounts to 48 per cent; in middle age, 74 per cent; and in old age, 84 per cent. The mode in which the organic and inorganic constituents are blended in the frame of man is worthy of deep consideration. When a fresh bone is digested in dilute hydro-chloric acid, all the mineral matter is removed; but the bone perfectly retains its shape, the residue consisting of flexible and elastic gelatinous tissue. If a similar bone is carefully burned where there is a free access of air, a white brittle mineral substance is obtained, which retains the perfect shape of the bone. This consists of the phosphate and carbonate of lime. These results show that every atom of mineral is associated with an atom of organic matter in our bones. Bone also contains a large quantity of oily matter, which may be extracted by boiling in water. This rises to the surface like oil, and may be removed in a solid cake when the liquid is cooled. Bone fat is manufactured in large quantities at establishments erected in the vicinity of most cities. Its composition is similar to other animal fats; only containing a greater quantity of oil. It is soft, and inodorous; is largely used in the manufacture of toilet grease; and makes a better toilet soap than common animal fat. Animal charcoal consists of bones which have been burned in retorts. The composition of ivory is similar to that of bone. Dentine—the bony part of the teeth, contains 68 per cent of mineral matter; enamel contains no less than 84 per cent, and 5 per cent of gelatine. Teeth which contain the most mineral matter—hard shining enamel—are the most enduring, and least liable to decay. How complex is the human frame, and how wonderful the processes carried on in the animal laboratory. The elements and compounds of which it is formed are eliminated from the food taken into the stomach, which when digested and converted into chyle, enter the blood—that red current which forced through innumerable minute canals by the action of the heart—"the wheel at the cistern,"—as it passes through the system, deposits its constituents of phosphate of lime, fibrin, albumen, casein, and gelatin, in all their appropriate places, forming the soft crystal of the eye, and the hard enamel of the tooth; the horny nails, the spiral hair, the tough skin, the elastic tendon, the strong bone, and the complex brain. The chemical transformations which take place in the living body surpass the comprehension of the wisest and most learned men. The chemist can tell what is the composition of the skin or other parts of the body; but he cannot form a bone, nor fabricate an inch of fibrous tissue. How excellent in wisdom and skill and power is He by whom man has been so fearfully and wonderfully made.

Trial of Mowing Machines.

We learn from the *Country Gentleman*, that a trial of mowers took place at Huntsville, near Albany, on Thursday, the 9th inst., under the auspices of the Albany County Agricultural Society. The ground was level, and the grass (timothy) in good condition. There were eight machines entered for competition, viz., "Shipman's," manufactured by Shipman & Son, Springfield Center, N. Y.; the "Farmer," manufactured by Parmenter & Bramwell, Troy, N. Y.; the "Monitor," manufactured by F. Nishwitz, Williamsburgh, N. Y.; the "Hubbard Light Mower," manufactured by C. Tompkins, Troy; "Wood's Prize Mower," manufactured by Walter A. Wood, Hoosick Falls, N. Y.; "Hallenbeck's Mower," manufactured by Hallenbeck & Cunningham, Albany, N. Y.; the "Buckeye," manufactured by J. P. Adriance, Poughkeepsie, N. Y.; and the "Union Mower," manufactured by the Union Mowing Machine Company, Worcester, Mass. The ground having been previously divided into eight equal portions of one half acre each, the owners drew lots for their respective stations. All started together at a given signal. The first machine to complete its task was the "Farmer;" time about twenty-one minutes. The judges have not yet made their report.

Calomel and Tartar Emetic Prohibited.

An order has been issued by Surgeon-General Hammond against the use of calomel, and tartar emetic, in the army. In that order it is stated that the administration of calomel has been frequently pushed to excess by military surgeons, and that its abuse has produced melancholy effects, such as profuse salivation and mercurial gangrene. It seemed impossible to remedy this evil, except by striking calomel from among the medical supplies of the army.

From the records of the Surgeon-General's office it has been conclusively proved that diseases prevalent in the army may be as efficiently treated without, as with, tartar emetic; hence its prohibition.

EFFECTS OF MERCURY ON SHEEP.—Professor John Gamgee, in the *Edinburgh Veterinary Review*, draws attention to the mischief arising from the reckless use of mercurial ointment as a dressing for scabby sheep. Sheep, he says, and ruminants are more readily poisoned by mercury than any other domestic animal; and, in some instances, mercury appears to be the cause of death directly, by its effects on the blood; in others it seems to kill by the varnish with which it covers the skin, which hinders the exhalations from that organ, and engorges the lungs; in others, again, it seems to produce an enfeebling of the digestive powers, so that a change to a better diet proves fatal. Severe salivation and loosening of the teeth are common occurrences.

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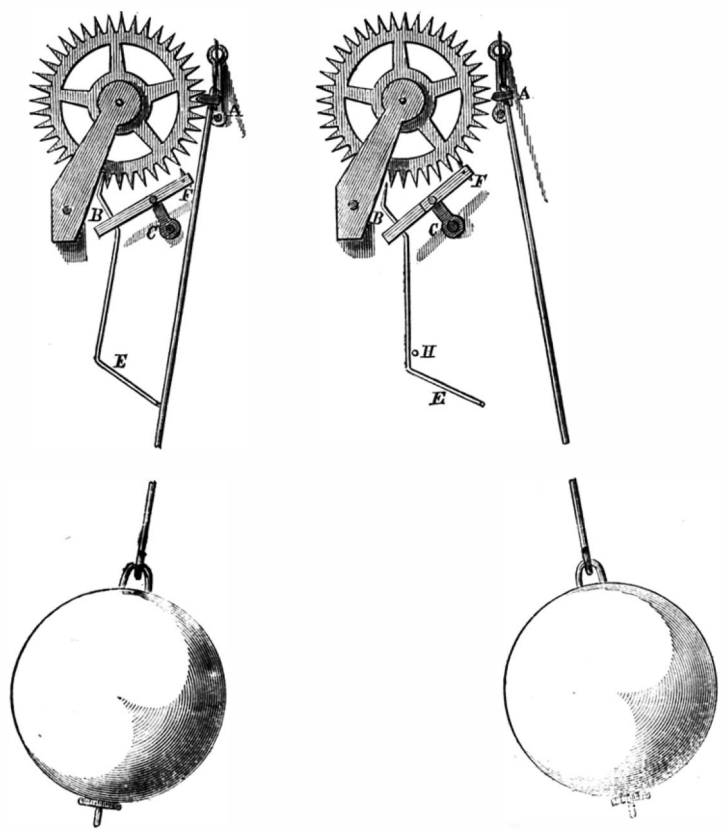
Improved Escapement.

The importance of producing a correct movement for time-measurers cannot be overrated, since so many of the important duties and avocations of life are dependent on their fidelity and general accuracy. Herewith we illustrate a novel escapement, which possesses decided advantages over any others that we have examined. In it, A, is the impulse pallet, and B, a guard to prevent injury from carelessness; this comes in contact with the wheel only when the pendulum and detent are both withdrawn. The detent, F, is supported by the arm, C, and this latter, as also the one, carrying the pendulum, can be adjusted as required. The pendulum lifts the detent by the wire, E, and there is also another wire, H, riveted to the plate, which the wire, E, drops against; the depth or hold upon the detent is regulated by bending the wire above this pin. This escapement has been thoroughly tested, and found to possess many advantages not hitherto attained, some of which are herein set forth:—It is claimed that clocks thus fitted will keep more accurate time than others not so constructed: that they are much more durable and will not get out of order so quickly as ordinary escapements: that as the pendulum receives its impulse directly from the crown wheel, the friction produced in transmitting power from the crown wheel through many connections to the pendulum, is obviated: and that consequently no oil is required on it, and there is less wear on the whole machinery of the clock. It is also constructed much more cheaply, and the pallets can be quickly removed, if necessary, for examination. Clocks constructed with this attachment have sweep-seconds—a good feature in time-pieces with short rods. This invention can be applied to any clock, new or old.



HART'S PATENT ESCAPEMENT.

The patent on this invention is ordered to issue to William Hart, a practical horologist of Mayville, Wis., through the Scientific American Patent Agency. Licenses to manufacture this escapement can be had by addressing the inventor as above.

SILICATED SOAPS.

Soap, strictly speaking, was formerly understood to mean a composition of oil, or grease, with an alkali; but the term has now a more extended application. Various other substances than grease and oil have been employed as mixtures, and are held to be legitimate constituents of soap. Formerly, resin was extensively employed for this purpose; but owing to its scarcity since the war commenced, and the high price thence resulting, its use has been almost abandoned, and silica—the chief ingredient of sand and quartz—is now largely substituted. When pure, it is insoluble in most acids, or in water; and it is actually infusible in fire. Yet it can be converted into a liquid; and it is used to mix with soap; hence originated the term "silicated soap." Quartz sand subjected to a high degree of heat, and mixed with a caustic alkali, such as soda, or potash, becomes soluble: and this is the substance now largely employed as a substitute for resin in soap making.

The application of the silicate of soda, as a soap mixture, has been long known; but several patents have recently been obtained for improved modes of treating and mixing it.

On Oct. 14, 1862, Dudley B. Chapman, of Milford, Mass., obtained a patent for making a silicated soap which is described in his specification as follows:—"One part by weight of an alkaline silicate (such as silicate of soda), one part by weight of vegetable flour or farina, and one half part by weight of sal soda. The sal soda is to be melted with a little water, in a kettle, over a slow fire; the flour is then thoroughly mixed with it; after which the alkaline silicate is added, and the whole thoroughly incorporated together. This composition is to be mixed with soap made of grease or oil, and alkali, when it is in the liquid state, and the whole of the ingredients boiled together for a few minutes." It is stated that vegetable flour assists the silicate in combining with the soap, and a larger quantity of the silicate may thus be used with a given quantity of soap. It also makes a firmer soap, and prevents it from efflorescing. The claim is for "the combination of a carbonate, or caustic soda, an alkaline silicate, and vegetable flour, with soap, or a saponified oil or fat substance."

On Jan. 20, 1863, Mr. Dudley obtained another patent for a silicated soap, described in his specification as follows:—"Hitherto, the method of using soluble alkaline silicates in the manufacture of soap, has been to make a soap in the usual manner by boiling a hydrated alkali with grease, oil, or tallow, or one or more of these combined with resin; and while the soap was in a fluid state, to reduce the soluble alkaline silicate to a fluid, by the addition of water, then mixing it with the soap. By this process, an alkaline silicate containing an excess of free alkali (that is more than sufficient alkali to hold the silica in solution, which most alkaline silicates do) cannot be used to advantage, because the excess of alkali in the silicate granulates or opens the soap in such a manner as to precipitate the silicated solution to the bottom. Therefore the use of highly alkaline silicates in soap has been generally abandoned. By my process, I can use in soap, a silicate containing any quantity of free alkali; and in such proportions, that in some cases the quantity of alkaline silicate used will exceed in weight all the other ingredients combined; thereby materially cheapening as well as improving the quantity of soap.

"In manufacturing by my process, I first ascertain the quantity of free alkali which the silicate to be employed contains. I next by the addition of water, reduce the silicate to a fluid, or gelatinous condition; and when ready for use, have it heated to about forty degrees (centigrade). I next take a quantity of any one or more of the following ingredients, sufficient to completely neutralize the excess of alkali which the silicate contains:—To wit, grease, oil of any kind, tallow, resin, or any of these, combined with flour, or starch of any kind; and prepare them by heating the grease, oil, tallow, or resin, as the case may be, to about seventy degrees, centigrade; at which heat I add the alkaline silicate prepared as above, and mix thoroughly, by stirring for a short time. Next I mold the mixture in frames and allow it to cool. If I use flour or starch in the combination, I mix it in a dry state with the melted grease, or fatty matter, before adding the silicate. If the excess of alkali in the silicate is mostly caustic, the soap thus made, will, in the course of three or four days, be fit to cut up, or to be formed into bars, either for use or sale. Should the alkali be mostly a carbonate, the mass should be re-heated, in a day or two, to about eighty degrees centigrade, and next it should be framed, after which (in about two days), it will be ready to be cut or formed into bars. In this way I obtain a very fine neutral soap, in a much cheaper manner than by any other process.

"The excess of alkali in the silicate completely saponifies the ingredients used to neutralize it, and these ingredients in the process of saponification absorb all the excess of water with which we are obliged to dilute silicates in order to render them sufficiently fluid to combine with soaps. Therefore a soap made in this manner will not shrink in weight as much as a soap in which silicate is mixed after the soap is finished; for such soaps have already taken up about forty per cent of water from the hydrated alkali with which they are boiled, and the extra water in the silicate only tends to impair their value. Another advantage which this process ensures to the soap, is, that the glycerine having an affinity for the moisture contained in the atmosphere, prevents the soap from becoming too hard, by age, as silicated soap is liable to do.

"I claim, as my invention, and as an improved manufacture, a soap made in the improved manner hereinbefore described, viz., of a hot, fatty matter or matters; and a solution of alkaline silicate, combined at one operation, without the process of being boiled after the addition of the solution of silicate to the hot fat."

A patent (re-issue), was also granted to George E. Vanderburgh, of New York City, on March 10, 1863, for a silicated soap, which is described in the specification as follows:—"I take any kind of common soap, reduce it to a fluid state, and add thereto any desired proportion of dissolved alkaline silicate, which contains by analysis less than one-half as much potash, or less than one-third as much soda or silica, and then after thoroughly incorporating this mixture of soap and silicate, whilst they are kept at a proper temperature, I run the mixture into frames to harden, and afterwards cut the same into merchantable shapes.

The claim is "the use of a dissolved alkaline silicate as an ingredient in and component of soap; but this I only claim when the dissolved alkaline silicate thus employed contains, by chemical analysis, less than one third as much soda, or less than one-half as much potash as silica."

The soap manufacture is of great importance as a branch of the useful industrial arts. Some philosophers have held that the quantity of soap consumed by a nation may be taken as an index of its civilization; and this is not a chimerical idea, when it is considered that it is chiefly employed to promote cleanliness, in person and clothing. But whether the use of silicates, resin, and other substances, or mixtures, with genuine soap, composed of oil, grease, or tallow and alkali, is an improvement, is another question. Many persons believe that these are foreign mixtures, which only increase the quantity.

Mr. Graw, a French physician, proposes to destroy the taste of intensely-bitter medicines by mixing chloroform with them in certain proportions. He claims that the taste and odor, even of assafetida, can be annihilated.

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Correspondence

Why our Big Cannon are a Failure.

Messrs. Editors:—Without entering into any discussion on the many scientific points connected with the strength, &c., of the various kinds of metals, I desire to state one or two practical, common-sense reasons, why our big guns are a failure. I assume that they are a failure, for that every well-informed man whom I have met, admits. Of course, I do not mean that they cannot be fired; but that they fail to produce any such results as were expected and predicted of them. First, they are a failure, simply because, being made of a weak material—cast-iron—they have not sufficient strength to permit the use of the requisite quantity of powder. That tells the whole story. Suppose I were to propose that our rifles, muskets, and pistol barrels should be made of cast-iron, what would any person of sense say? Why, that I was either a fool or a lunatic! Now, without hinting that Admiral Dahlgren is either, I should like that he or any other man, would tell us wherein that would differ from his present practice of making our big guns of cast-iron alone? Are not large and small arms both operated upon the same principle—used for the same purpose—and subjected to the same forces—differing only in degree or quantity? If cast-iron is best for large guns, why not for small ones, also? If wrought-iron, or steel, is best for rifles, why not for cannon also? Or, if a union of two metals is best for the one, why not also for the other?

Second, they are a failure, because the quantity of powder used is altogether too small for the weight of the ball. This is a direct result of the first proposition; and may be considered as a repitition of it in another form. To understand the full force of this, let me illustrate briefly. Any projectile, to produce the best result, must have a certain amount of weight; else it has no force, or velocity. For instance, a chip of wood cannot be thrown to a great distance, or with great velocity, even if you use a tun of powder upon it; and a shaving, or other lighter material, will have still less velocity and force, and go a less distance; no matter how much power is used to start it. It does not acquire momentum, because it lacks weight, and is not sufficiently compact and heavy. A stone will go further, and strike with greater force; and a lead ball still more so. On the other hand, if the projectile be too heavy for the propelling force, the same result will follow. It will not be moved with velocity; consequently will go but a short distance, and strike with but little penetrating force. Every school-boy understands this perfectly; and hence, if he desires to break a window, or batter down a door, he does not take a chip so light that it will not reach the object, nor a stone so heavy that he cannot throw it. On the contrary, he selects one having sufficient weight to give it momentum; yet not too heavy for his propelling power. Thus it will be seen that there is a limit to the weight of the projectile, in both directions. It must be neither too light, nor too heavy; and—what is equally important—it must be proportioned to the propelling power—the charge of powder.

Now, the whole trouble with our *Monitor* Dahlgren guns is that they have not sufficient propelling power—they don't burn enough powder. They cannot do so, because they are too weak; and they are too weak, because they aremade of cast-iron. "That's what's the matter." True enough, a large ball is a very destructive thing, if it hits hard; but not if it falls short, and don't hit at all, or barely reaches the object, as it stops. You can never batter down a man's door by throwing rocks so large that they just do not reach it, or barely touch it. Better take a smaller one, and send it with more force—it will do a great deal more execution.

The only account that I have yet seen of these huge guns producing any important result, was in the experiment upon an iron-clad target, at the navy yard, in this city. There, it will be recollected, they used the Stafford projectile—a sub-caliber shot—a 9-inch projectile fired from a 15-inch gun, at short range, and having a weight in proportion to the charge. There is no doubt that at a very short range, the big balls would have sufficient velocity to cause great damage; but before they could be got within range of the enemy, his steel rifled guns and steel projectiles would sink or disable vessels carrying our big guns, as at Charleston. In an article on the blockade, published on page 310, Vol. VIII. (new series) of the Scientific American, I see it stated that the Whitworth guns employed by the rebels are effective at five miles. Certainly, no one will pretend that any of our 15-inch guns have begun to do anything like that. What nonsense then to continue wasting money on them, when so much better ones are known to exist! Therefore, I trust the statement is true which is referred to in your article on page 330 of the same volume, on "Changes in the Iron-clads," that these Dahlgren guns are to be replaced by others using 75 pounds of powder. That is a step in the right direction; as all experience, at home and abroad, fully testifies. To please the fancy of Admiral Dahlgren, in these huge experiments, everything else, including efficiency, and, of course, success, has been sacrificed. Instead of from ten to sixty guns, our war vessels now carry but two, and they so ponderous, clumsy and unsafe, that they can only be fired at long intervals, with small charges—occupying much room—employing many men to handle them, and doing comparatively little damage to the enemy. I fully agree with you in the idea, that we can produce as good guns and projectiles as the Whitworth, or any other that has been made; but it will not be done by Dahlgren, or any one following in his footsteps. That will only be accomplished when the intelligent inventors of the country can obtain a hearing, and have a fair trial at the hands of the Government; instead of being thrust aside by officials intent upon carrying out their old-fogy ideas at the nations expense; regardless of their effect upon the contest in which we are involved.

It is a great pity that Gongress did not, at the extra session, make an appropriation, and provide for the appointment of a board, composed of the most competent men in the nation, who should in no way be connected with any pet scheme or contract, to receive and fairly test every improvement submitted to them by inventors. Had that been done—as urged by many intelligent and earnest persons—we should long before this have known exactly which were the best guns and projectiles; instead of being as we now are, still in ignorance and doubt upon this important subject. The money already wasted upon these monster failures, would have more than defrayed all the expenses of such a board.

Rifleman

Washington, July 18, 1863.

The Stafford Projectile.

Messrs. Editors:—I am much obliged for your timely remarks in the Scientific American of the 25th inst., noticing the report of Commodore Turner, of the new *Ironsides*, in regard to some shot fired by his order from the 8-inch Parrott gun.

The truth is, that in obtaining shot of my patent for service, the order was given for 250 pound shot, of large caliber, never before tested: the heaviest shot ever tried by me having been from the 7½-inch Dahlgren gun: weight of shot 85 and 108 pounds. Before the 250 were finished, I sent samples of them to Washington, and urged to have them put immediately under fire, on from 6 to 9 inches of iron. This, however, was neglected; and the shot were sent off without trying one of them. On testing them, it was ascertained that the rear sabot or reinforce, was too light for this weight of shot; and the fault was in not finding this out before, and having it remedied, as will be done in a few days.

All the other sizes have been under fire, and prove, as they always have done, the most destructive shot used in the service. The price may seem large, but cast steel at 22 cents per pound, rough, is no fault of mine. Time will prove it the cheapest shot that can be made for certain purposes, for the reason that nothing else than good steel will do the job. One of these shot, properly made, if fired against an oblique surface of iron, is worth a tun of anything else; and the price, in such a case, is nothing. Any shot fired by me at West Point, or Washington, for penetration, would have sunk the *Merrimac;* while tuns of round missiles were hurled at this monster, which in every instance were defeated by her sloping armor.

In no experiment in this country or Europe, has 70 pounds of metal been fired through 6 and 7 inches of iron, from a cast-iron gun, with 14 pounds of powder, until I did it at West Point and in Washington.

The matter sums up thus: four shot, never before tested, have been fired to sea, and tumbled. This is no fault of the principle of the shot. The sabot being too weak for the weight of metal, was the trouble. That will soon be remedied, and when the remainder of the 250 ordered are heard of again, it will be from the wreck of some fort or iron ship.

More test experiments will soon be made in Washington and New York, against heavier targets than any ever before tried. Your readers will be kept posted as to the results.

C. W. Stafford, 48 Pine street.

New York, July 20, 1863.

Zinc Paint—Its Advantages and Disadvantages.

Messrs. Editors:—I am a practical house painter, and wish to elicit information which will be of interest and value to the public at large, as well as to those who are specially engaged in the use of paint. Among the other advantages resulting from the use of zinc paint, is this, that a room, such as a sleeping apartment, painted with it, when dry, is without the bad smell, or other injurious effects which follow the use of lead paint. During the last six years use of this material, I have not had a man sick with painter's colic.

Another advantage is that a house painted with white zinc will hold its color, for years, whereas white lead will turn yellow in a few months. I venture to say that at the end of five years a house painted with zinc will look better than it would at the end of so many months if painted with lead.

Its drawback is that in repairing a house which has been done with zinc, a few years afterwards, the new paint does not adhere to the old, but peels off. I have tried everything my imagination suggests to find a remedy, but to no purpose. I have consulted the best chemists without avail, as also manufacturers of zinc, who can furnish no useful information, though they are most deeply interested in the discovery, as its use must be abandoned if no remedy is found. I hope this may attract the attention of scientific men to the subject. S. B. F.

New York, July, 1860.

Penetration of Projectiles at Different Distances from the Muzzle.

Messrs. Editors:—You inquire if I have demonstrated that the penetrative power of a rifle bullet is greater at a distance of twenty feet from the muzzle than at one foot from it. I have tested the matter to my satisfaction with the following results:—For every inch a bullet will penetrate a uniformly hard substance, at a distance of one foot from the muzzle, it will only penetrate .97916+ of an inch *at* the muzzle; at a distance of five feet, it will penetrate 1.015625 inches; at ten feet, 1.0415+; at twenty feet, 1.0865 inches; and from this, onward, the power to penetrate gradually decreases.

Theory:—The projectile force does not cease to act on the bullet at the muzzle, but follows it up for some distance; still pushing it forward, which accelerates its motion. As long as the force behind the bullet is greater than the resistance of the atmosphere before it, the motion will become more and more accelerated; but as soon as the projectile force is so far exhausted as to be only equal to the resistance before the ball, from that point its velocity is gradually retarded. The place, then, where the penetration of a rifle bullet will be greatest, must be just where the force behind, and the resistance before, it are equal; which will be found to be at or near twenty feet. G. Buchanan.

Hickory, Pa., July 10, 1863.

One of our exchanges, the Cumberland (Md.) *Union*, issued on the 4th of July, signalized the day by printing two sides of its impression in red and blue ink, which, on the white paper, was emblematical of our national colors, and proclaimed emphatically the sentiments of the proprietors; they must have had considerable trouble in displaying their loyalty so conspicuously.

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Steam Domes for Locomotives.

The following extracts are taken from a very sensible article on the above-named subject, in the *Mechanic's Magazine* (London) :—

"Our engineers still seem to regard the steam dome as an indispensable adjunct to the locomotive ; at least, few or none are built without them. Indeed there seems to be rather a tendency to increase their size, and over-estimate their importance : due in some measure, perhaps, to the increased adoption of the flush boiler, which is not considered to be so well suited to the supply of dry steam, as those which have the outside fire-box shell considerably raised above the cylindrical portion of the boiler. The advantages held out by the dome are, however, more than doubtful, and can scarcely compensate for the additional weight and expense incurred by its use ; although it is urged that without it considerable difficulty is always experienced from priming. This, at best, but proves that such contrivances may be employed as a means of repairing faults of design in other departments of the engine ; and by no means demonstrates as a fact that they are actually indispensable, or, indeed, deserving of general adoption. In many engines we find them either omitted altogether, without at all impairing the efficiency of the machine ; or of such small size that they bear no comparison with the huge edifices recently introduced. Bury scarcely ever used the steam dome in its present form. True, he placed an immense hemispherical affair over his fire-box ; but this, in all cases, formed part of the external shell, and was merely a means of supplying the steam room. Forester's small domes were placed on an outside fire-box shell, the top of which was already raised 12 or 14 inches above the barrel. Such domes did not contain a cylinder full of steam ; and were only intended to permit the elevation of the steam-pipe to a good distance above the water level—a plan since carried out by other makers with good results. Stephenson, it is true, did of old, as his successors do now, pretend to the extension of steam room by the use of large domes : though the advantages gained from them in that way can be realized by far better arrangements.

"All things considered, if proper care be taken to secure perfect circulation in the water, we consider them unnecessary and injurious. It is not very easy to make a good dome. Its welding is a job which requires both skill and care ; and the difficulty experienced to some extent in making up the joint between it and the boiler shell, together with the cost of the outside ornamental casting, constitute it a very considerable item of expense. Its connection with the boiler also must in some degree weaken the latter, by rendering an aperture of considerable size necessary. Although a man-hole is always requisite to permit the proper inspection of the interior of the boiler, it does not follow, as a matter of course, that this is best closed by a steam dome. The contrary is the fact ; for the dome should be placed forward when the ebullition is least ; while the proper situation for the man-hole is, undoubtedly, over the fire-box. Indeed we find one there as often as not ; while a steam dome is fixed near the chimney, and supplied with an amount of internal apparatus, sufficient to prevent its use as an entrance to the barrel.

"A very slight increase in the diameter of a boiler, will easily provide as much additional steam room as a very large dome can supply, and does it, too, without extra expense or trouble, or weakening the boiler to any appreciable extent : not so much indeed as a large hole in the shell can do. Still some engineers seem to consider it necessary that the steam should be drawn from a point considerably above the water level ; a conclusion scarcely borne out in practice : as we find very many engines, both here and in America, getting on without domes ; and supplying steam to the cylinders dry enough to cause no complaint.

"A flush boiler, however, undisfigured by a dome, is, in our opinion, absolutely necessary to that beauty and simplicity of appearance which is such a characteristic of the best class of locomotive. Dry steam may easily be obtained by the use of one or more perforated pipes traversing the upper part of the boiler. By diffusing the draft of steam, and not permitting it to concentrate at any particular place, priming may usually be best avoided, especially if ample water space is provided round the fire-box as well. If this last is constructed with sloping sides, it adds not only to the durability of the plates of which it is composed, but enables the boiler to supply dry steam even with the heaviest loads. Priming is far more due to defective circulation than to anything else ; and with proper attention to the means of providing for this in the best manner, and by the use of perforated pipes, we see no reason why the unsightly and expensive dome may not be banished from our engines."

Hazel Nuts.

Hazel nuts are the fruit of the wild bush of Corylus Avellana, unchanged or unimproved by cultivation. The fruit differs from that of the domesticated varieties only in being smaller, while the tree is more hardy. This plant, which is a native of all the cooler parts of Europe, Northern Asia, and North America, is the parent of the many varieties of nuts and filberts now cultivated for their fruit. The filbert is the fruit of the tubulosa variety of the Corylus Avellana. The term was originally applied to those kinds of nuts which have very long husks ; but owing to the number of varieties that have of late years been obtained, this distinction, which was never scientific, appears to be nearly disregarded, and nuts and filberts are almost synonymous terms, excepting that the wild uncultivated fruit and those varieties which most nearly approach it are never called filberts. In order to preserve filberts in a fresh and plump state, it is only necessary to prevent their parting with their moisture by evaporation. Burying them in heaps in the earth, putting them in earthern jars in a cellar, and covering them with dry sand are all excellent plans. The hazel nut of America is smaller than that of Spain, but it possesses a more pleasant taste, and might be gathered in large quantities in many places. It is however, never gathered like chesnuts for the market, all the filberts and hazel nuts sold are imported. About 182,000 bushels are exported from Spain annually.

The Difference between Man and Ape.

At a recent ordinary meeting of the Anthropological Society (London, Eng.,) a discussion took place on the above-named subject, after the reading of a paper, "On the Brain of a Microcephalic Female Idiot." Professor Owen observed that as the brain of man is more complex in its organization than the brain of inferior animals, it is more subject to injury, and more liable to experience the want of perfect development. Instances of idiocy occur among all races of mankind. Extreme smallness of the skull indicated in all cases want of intellect approaching to idiocy. Alluding to the attempts that have been made to find a link of connection between man and apes, he remarked that it was possible that an idiot with an imperfectly developed brain might wander into some cave, and there die, and in two or three hundred years his bones might be covered with mud, or be imbedded in stalagmite, and when discovered, such a skull might be adduced as affording the looked-for link connecting man with the inferior animals ; but the brain of such an idiot as the female whose skull was exhibited is distinctly different from that of the anthropoid apes ; and he expressed an opinion that the difference is too wide to be bridged over by the skull of any creature yet discovered.

Machinery and Hand Labor.

Not such a great while ago our thread was spun between the thumb and the finger, and all our cloth woven in the clumsiest of hand-looms. Now, by means of a spinning-jenny and weaving machinery, one person will make as much as two hundred yards of cloth in a day. Before the invention of the cotton gin, one person could not prepare one pound of cotton so easily as he can now prepare one hundred pounds. Our grandmothers could barely knit one pair of socks in a day—now, by means of a machine, one little girl can turn out a hundred dollars' worth of knitted materials in a day. A few years ago we were told it took seventeen men to make a complete pin ; now the machine is fed with the raw material, which is not touched again until rolled up in papers of pins. In Providence, R. I., there is to-day a machine that takes a strip of metal from a coil, and makes two hundred and thirty inches of delicate chain out of it, in a day. The metals are no longer worked by hand—a slow wearing process ; they are shaved, sawed, bored and hammered, with the greatest ease and accuracy, as much as if they were of the softest pine.

An instrument has been contrived and perfected of exceedingly delicate powers, which measures the operation of mind itself—tells the exact time it takes for a sensation from the finger to reach the brain—two-tenths of a second ! Go into a certain india-rubber store in New York, and you will find a hundred different articles made of that one staple—only a few years ago good for nothing but to rub out marks, and furnish active jawed young persons something to chew. As wood gives out, coal pits are found everywhere. We begin to fear for lights with which to illuminate our homes, and make all things cheerful ; when lo ! oil is distilled from coal, and we even have streams of it spouting out of the ground for us to fill our lamps with ! Coal tar, once regarded as useless, is now manufactured into many different merchantable articles, some of them of great value.

European Locomotives.

In a paper lately given to the public by D. K. Clark,—superintendent of machinery at the London International Exhibition of last year,—it is stated that there were twenty locomotives altogether exhibited, of which eleven were English, and nine foreign. Fourteen had outside cylinders, and six inside cylinders. Most of the engines were specially constructed for burning coal, a feature which has been introduced entirely since the former Exhibition of 1851. The English engines were mainly examples of the standard classes in general use on the principal English railways. Of the eleven exhibited, seven had outside cylinders and four had inside cylinders. The foreign locomotives showed greater variety and originality of design ; and were mainly constructed for lines with very heavy gradients and sharp curves, which are generally associated together on railways in mountainous districts, causing special mechanical difficulties which do not occur in the case of English railways. The most satisfactory of the plans for surmounting these difficulties is considered to be that of an articulated or bogie engine, having a single long boiler of large dimensions, mounted on separate carriages, with a swivelling connection, each having its own separate pair of cylinders, working six coupled wheels placed near together ; so that the engine, although of great total length, could readily pass round very sharp curves, while the whole of the weight is made available for driving adhesion. A marked feature of the foreign engines is the position of the valve gear outside the cylinders ; but this is considered objectionable in respect of good working and durability. In the large foreign engines as well as in some of the English, the boiler tubes have been crowded too close together, with the object of obtaining a larger extent of surface, from a mistaken idea that heating surface is mechanically the equivalent of evaporative power, without regard to the equally important consideration of the circulation of the water amongst the tubes. Another marked difference between the engines exhibited in 1851, and those shown in this Exhibition, is that, in the latter, Giffard's injectors have been extensively employed, as a substitute for the feed pumps universally used at the former period.

COAL-BEDS.—Heath's mine in Virginia, is represented to contain a coal bed fifty feet in thickness ; a coal bed near Wilkesbarre, Pa., is said to be twenty-five feet thick ; at Mauch Chunk is a coal bed forty to fifty feet deep, and in the basin of the Schuylkill are fifty alternate seams of coal, twenty-five of which are more than three feet in thickness. In Nova Scotia is a coal formation fourteen hundred feet deep, and containing seventy-five alternate layers of coal. The Whitehaven coal mine in England, has been worked twelve hundred feet deep, and extends a mile under the sea, and the Newcastle coal mine in the same country has been worked to the depth of fifteen hundred feet, and bored to a similar additional depth without finding the bottom of the coal measure.

THE national armory in Springfield, Mass., made, in the month of June, 25,000 rifled muskets.

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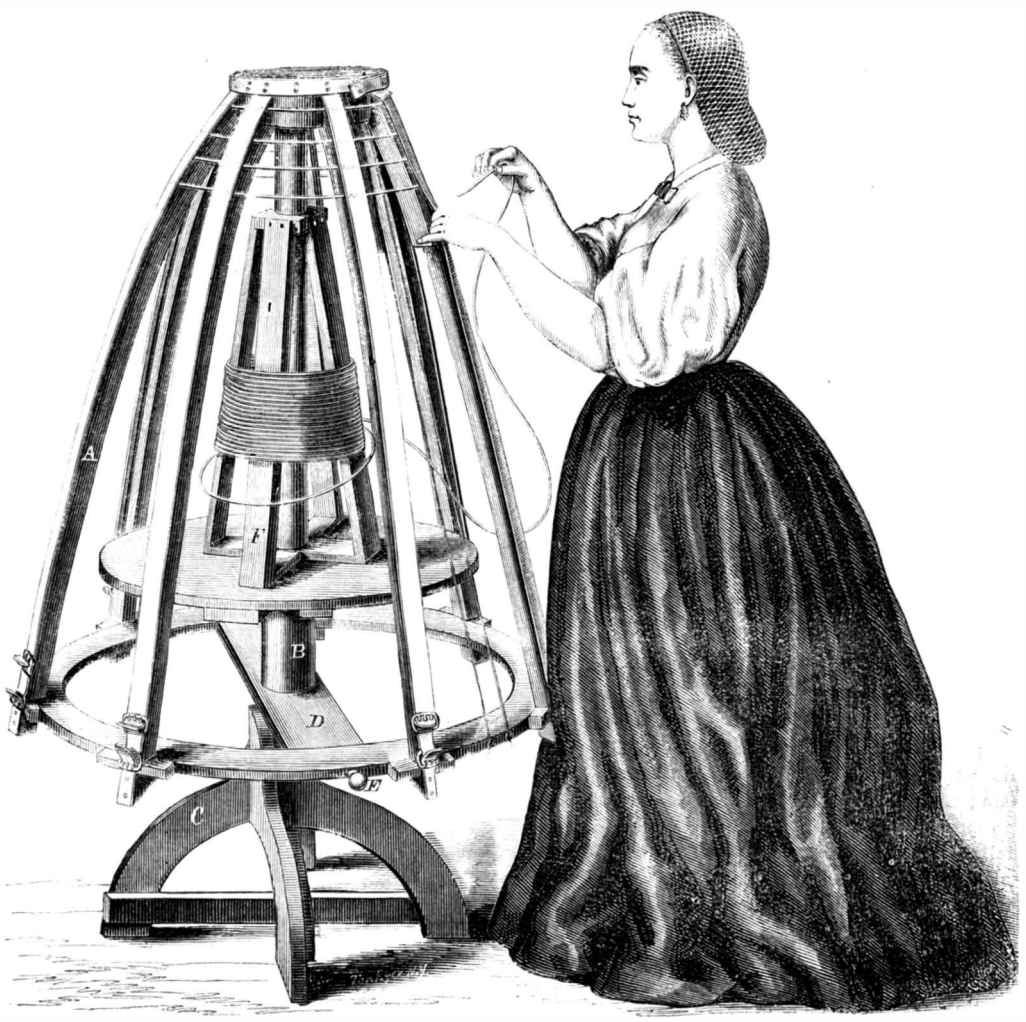
Improved Hoop Skirt Frame.

The close competition which exists in some branches of trade, renders it extremely necessary that no device or expedient which will facilitate business should be left unadopted, This is particularly true of hoop-skirt manufacturing, where the successful prosecution of it depends so much upon the amount and quality of the work an operator is able to perform in a given time. The skirt frame herewith illustrated, is a great improvement upon the old ones in general use; as it occupies very much less room on the floor, and is further desirable in that it combines in itself all that is necessary to finish a skirt quickly and thoroughly.

The frame, A, is mounted on a post, B, and revolves freely about it. This post is fixed in the stand, C, and of course is rigid. The ribs of the frame, A, unite at the bottom in a circular base, which has a cross-piece, D, to center the frame, and also strengthen it; and the cross-piece is retained in its place by the pins, E. The reel, F, on which the hoop wire is wound, is contained within the frame, and also revolves easily about the post, B. These are the main features of the invention.

The objects of it are, that all parts of the skirt, and the materials for making it—such as the wire, tapes, &c., on the frame, convenience for glueing the tapes prior to fastening them permanently with metallic clasps, the arrangement of the wire reel within the frame—are entirely under the operator's eye and hand, and save much time and labor to all. The skirts, when finished, are hoisted up over the frame, and suspended from the ceiling by a cord; this disposition of the work keeps it in perfect shape, and does not displace the tapes, as in the old method of removing the skirts when glued—gathering them up in a mass, and hanging them on the wall. So also with the reel—many advantages are obtained from placing it in the position shown in the engraving, instead of below the skirt frame near the floor, as is the case in other skirt frames, where the clean wire is soiled by dust and glue which drop upon it. It is also feasible to use two different kinds of wire on this reel—a feature which, we are assured, is impossible in ordinary frames. The wire also runs off at a regular and even rate of speed, as it is used by the operator; and is not in the way, nor does it require to be pulled off; but is readily controlled as required. The cross-piece of the frame, at the bottom, may be instantly removed when necessary to fill the reel with wire, or for any other purpose, by simply withdrawing the wooden pins; the frame may then be lifted off clear of the pedestal. These features render this frame a very convenient apparatus. It was patented through the Scientific American Patent Agency, on June 9, 1863, by James F. J. Gunning, of New York city. One half of the patent has been assigned to S. T. and A. T. Myer. Further information can be had by addressing the patentee, at 401 Broadway, New York.



GUNNING'S PATENT HOOP-SKIRT FRAME.

THE OLIER PATENT FOR SECURITY PAPER.

This patent, issued June 9, 1863, to J. P. Olier, of France, was granted for "new and improved methods of making a security paper, to prevent counterfeiting of bank-notes, &c., as well as alteration of public and private writings; and applicable to an opaque pasteboard for playing cards, railway and other tickets." The Olier paper is now secured by patent in all the principal countries of Europe, and has been adopted by the national authorities in several, while pending negotiations promise to extend its utilities still further. It is adopted by the Bank of France, which may be regarded as the mother of this invention; since it was under its direction, supervision, and actuation, and to satisfy its necessities, that the experiments were instituted and carried on, which culminated in success.

The Olier paper is a fabric, distinct in idea, manufacture, and appearance, as well as in its properties, from every other paper previously known. Beautiful in texture and appearance, extremely pliant and durable, and, by its unmistakeable external peculiarity, offering a sure warrant of authenticity; this valuable product of French ingenuity and skill fulfils every condition demanded in a security paper.

The Olier paper is made at the form, by hand; like the paper now used by the United States Treasury Department. It is composed of three layers—a colored enclosed by two white ones—which, being united on the form before drying, constitute a single inseparable sheet. The middle colored layer is the distinguishing feature of the invention; and according to its nature, are the different qualities that adapt it to various uses.

The paper intended for bank-bills, has its interior layer colored with an indelible substance, which resists the bleaching action of acids, and which produces a beautiful and ineffaceable water-mark, or filigraine, resembling an engraving, in the middle of the paper. In the varying thicknesses of this coloring arise the clears and shadows of the drawing, which are distinctly perceptible when the sheet lies horizontally, in a brighter tracery of white than the general surface, and which, on the contrary, are black when the sheet is held vertically. When lying flat, the surface is marked with a distinct drawing, boldly relieved from the general tone of the paper, and exactly similar on both sides. But the grand peculiarity of this paper is, that every effect shown at the surface, is reversed when the sheet is interposed between the eye and the light. This effect cannot be produced except by one process, known only to Mr. Olier. It cannot be imitated by photography—cannot be destroyed by chemical action—defies use—foils imitation—and (so long as one particle of the fabric remains) shows itself as an unanswerable proof that the bill came only from one source, and must be genuine.

The interior layer, when colored with a volatile ink, forms a safety paper, which perfectly opposes any alteration of what may be written upon it. When the ink of the writing reaches the middle layer (which it is sure to do), any agent or solvent, used to obliterate the inscription, instantly decolors the interior coat as well, and leaves an ineffaceable sign of fraud upon the surface. The surface being originally white, no interior color can be introduced when it is once abstracted; and any attempt to erase the writing by scratching, uncovers the middle coat, and leaves a blue or black blotch where the attempt is made. The whole sheet cannot be bleached, for the water-marks, clouded and clear, cannot be restored. At once will be seen the vital interest of this paper to all who desire to execute writings that depend upon their immunity from alteration for their legality. Wills, deeds, bonds, mortgages, certificates, checks, drafts, promissory notes, bills of exchange, and writings of a commercial or public nature, by this paper are secured from fraud.

When the middle layer is thickened and deepened, and enclosed between denser layers, it forms a beautiful white pasteboard, glossy and smooth as ivory; and, no matter how thin, perfectly opaque to the strongest light. Cards may be made from it wholly white, like leaves of ivory, save the face; and since they are formed of a pasteboard throughout, not liable to warp or split, like the ordinary cards, which are composed of two or three sheets, glued together. This pasteboard may also be water-marked, and thus used for tickets, which cannot be counterfeited.

The last branch of this patent includes the production of a commodity not elsewhere found in the trade: *i. e*, a paper made from hemp, wonderfully thin and tough, yet bearing a distinct water-mark, and capable of taking a perfect impression of the finest steel engraving, dry. This is owing to a peculiar ingredient, mixed with the paste. Nothing like this fabric exists in the trade; and its unparalleled strength, pliancy, and durability, as well as its peculiar properties, must speedily make it a desideratum in the useful arts.

Any further particulars may be learned by personal interview with Edmond Gastineau, 21 Pearl street, New York.

OIL CREEK RAILROAD.—The Erie (Pa.) *Dispatch* states that this road is doing an immense business for one of its length. It brings out to Corry not less than 2,200 barrels of oil daily, and its mixed freight going South will average nearly half that amount of bulk. The completion of the road from Titusville to Oil City, is being pushed forward as rapidly as the scarcity of labor will permit. Four miles of the route beyond Titusville are ready for the iron, and the remainder will be graded and the track laid down by the 1st of September next.

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BIG GUNS--WHY THEY FAIL.

We publish on another page a communication from "A Rifleman," in which he indulges in a free criticism upon the folly of attempting the use of Admiral Dahlgren's gun in the reduction of rebel strongholds. There is considerable force in his arguments, and they ought to arrest the attention of the Navy Department. We were assured by a friend of ours who witnessed the reduction of Fort Pulaski, near Savannah, that the rifled guns of Parrott, and James's shells, were far more effective than anything else in compelling the surrender of that stronghold. So terrible was their effect, that an opening was made in the fort large enough to admit the entrance of a storming force, had it been necessary. We are also assured from other sources, that the brave and accomplished General Gilmore, now commanding the siege of Charleston, has declared that he could have taken Fort Pulaski with two of those rifled guns, at one-tenth the cost which attended the attack; and if permitted to arm the iron-clads—or even part of them—with those guns, and shells, he could take Sumter, or any other fort in possession of the rebels. We are also informed that Mr. Parrott offered to furnish, gratuitously, four of his very largest rifled guns (300-pounders); and that another party offered to furnish the James's shell on the same terms, upon condition that two of the *Monitors* should be armed with them for the fight; but that the offer was declined, because Dahlgren insisted on firing his own gun instead.

We do not undertake to vouch for the full truth of these statements; but their truth or falsity can be easily ascertained. We have no idea that the Government intends to neglect the use of the most powerful means at its command to put down rebellion; but we are inclined to think that our amiable Secretary of the Navy is sometimes blinded to the real merits of powerful ordnance, which has not the sanction of those whose axes are continually upon the public grindstone. Admiral Dahlgren, for instance, has long been chief of ordnance of the Navy Department. He is an able and accomplished man; and we hope he may succeed in his attack upon Charleston; but we fear that his prejudices are very closely bound up in Dahlgren's naval gun. It is the offspring of his own brain, and he very naturally cherishes it; but it does appear to us that the Secretary of the Navy might at least have the independence to accept the offer of Mr. Parrott, and allow one or two *Monitor* vessels to have something besides the Dahlgren gun. Let the experiment be fairly tried; and if Dahlgren's gun proves to be the best, its use will be continued; if not, the supporters of the Government have a right to expect that its further use will be dispensed with.

EXPANSIVE WORKING OF STEAM IN MARINE ENGINES.

In ocean steam navigation, the expenditure involved is much greater, proportionally, as the length of the voyage is increased. This is due, not only to the greater length of time necessarily occupied, and the greater quantity of materials consumed: but also to the space required for the materials to operate the vessel, which might otherwise be occupied by available paying cargo. Thus the coal required for a ten days' voyage, is double the quantity needed for a five day's trip; and as all the fuel must be carried by the vessel, it occupies double space, and necessitates the consumption of more power to carry it. The reduction of the quantity of coal usually consumed in ocean voyages, is a problem to which the attention of almost every inventive mind should be directed; for notwithstanding the numerous improvements which have been made in steam engineering, not a tithe of the heat-force of the fuel under combustion has yet been economized, and transformed into the mechanical power required for propelling vessels. There is, therefore, a large and inviting field presented to inventors, in this direction, for developing improvements. An article upon this subject from the *Engineer* (London), affords evidence of the interest taken in it by European engineers.

SIMPLE LOCOMOTIVE ENGINES.

While visiting one of our large engineering establishments lately, the superintendent pointed to a pile resembling a hay stack, covered with sail cloth, and with a humorous twinkle of the eye, said, "a big thing there." Lifting one end of the cover, he told us to take a look, which we did; but such a combination never before met our gaze. It was a steam-engine on wheels; and was provided with cog-wheels, sectors, bell-cranks, levers, and mechanical devices innumerable, packed as closely together as the works in a watch. Some men are "Jack of all trades; master of none;" and there are some machines designed to do an indescribable number of things, which are good for no *one* thing. This machine was one of those wonderful contrivances. It was intended to act as a common road engine, steam-plow, saw-mill, and several other things. But it was so complicated in arrangement as to be considered totally worthless for practical purposes; from the frequent leakages and disorder to which it was liable, and the difficulty of managing it properly. Simplicity of mechanism, is one of the great aims of thoroughly practical, common-sense engineers; and, above all other machines in the world, simplicity is most essential to a locomotive engine, either for rail or road. It is quite different from an engine that has a fixed position in a boat, or in a building; being subject to so many concussions and vicissitudes in moving itself. It should be constructed of as few parts as possible; in order to secure simplicity, lightness, and strength. The locomotives called "dummy engines," have been constructed to obviate a most senseless objection, which has been made to simple, common, high-pressure locomotives. The dummy is a condensing engine, which in addition to all the parts of a common locomotive, is provided with a condenser, extra pump, and other devices, involving extra weight, and complex mechanism; simply to make dumb the usual noise of the exhaust in the smoke pipe, while the engine is passing through streets. Every locomotive engineer knows that condensing engines are totally unfit for general railway purposes. Depending upon condensing engines, we never would have had our splendid railway system. The public in town and country should know that the common, simple, high-pressure locomotive, is safer than horses or *dummies*, and is more easily controlled; and that the prejudice against its use upon railways is worthy of the ignorance of the "dark ages."

THE VALUE OF RESEARCH.

Aside from the natural phenomena of the globe, most of the material operations upon it depend on skilled labor, and the intelligent co-operation of the human hand and brain. To-day, the chemist unfolds the secret of some subtle compound, or wondrous dye; to-morrow, the mechanic in his workshop combines anew the wheel, the pulley, and the axle, and from them produces a new and valuable machine. So also with the weaver. He intertwines in his fabric aspirations, hopes, and desires, which seem to tinge the bright pattern he elaborates. These artisans, members of separate and distinct callings, did not obtain their elementary knowledge and skill by intuition: they acquired it by close, untiring study, and continuous research.

At this very moment the earth teems with wealth, undiscovered, and unknown, only waiting to be brought to light by the industry and perseverance of man. Nature has, locked up in her laboratory, vast stores of riches, which generations yet unborn shall delve and dig for. In one way or another, the natural forces of the globe are continually developing new features useful and ornamental to man. Quite recently have been discovered the beautiful aniline dyes, rivalling those of Tyre in their richness. But lately the Franklinite ore has been discovered,—a metal which bids fair to inaugurate a newer ain iron castings. In brief, either new substances, or else ingenious combinations of old ones, are continually brought to public notice.

It is very true that a lucky thought may sometimes occur to anyone, which put in practice, produces a rich reward to the fortunate possessor. In like manner, an idler strolling in the mountains, may stumble on, and pick up a diamond. But, in general, neither fortunes nor diamonds are to be had in this way; and the only sure guide to their possession is through diligent study, and careful attention to a single subject. How often in the history of invention and discovery do we hear of the struggles of an inventor before his ideas are perfected; but how certain and gratifying the reward, when the invention is of unmistakable utility. A man who has a talent for invention is the owner of a mine of wealth if he only works it properly; and he is just as truly a public benefactor in his way as Franklin or Fulton. Even he who invents the deadliest gun, or makes the most impenetrable iron-clad ship, is also humanitarian in principle. The destruction of those engaged in it, tends largely to limit the prosecution of war, and confine its ravages. Men will learn the art of war no longer just so soon as they invent guns or defenses of a kind that preclude the possibility of success to either side. When this occurs, and not till then, shall the races of the earth cease to harrass and annoy each other. Inventors, whoever you are, and whatever the product of your ingenuity may be, turn into the Patent Office what you have patiently elaborated; and avail yourselves of its facilities for furthering your interests: thus at the outset making assurance doubly sure, so that no vexatious delay or failure may occur through your submitting an imperfect, or badly constructed model. Your reward is as sure to follow, as the reaper is certain to gather in the product of the seed he has sown, when harvest time comes round.

RIOTS AND MOB LAW.

The recent scandalous exhibitions of mob law which have disgraced the city are now over. The fires of passion are not quenched however, but smoulder. Within the confines of a great city is gathered every conceivable degree of moral worth and worthlessness. Restraint being removed, law being overborne, riot ensues as a natural consequence. The inference is plain; had the same prompt action ensued in this city which was adopted in Boston and other places upon the first appearance of the outbreak, families would not now mourn, property would not have been sacrificed, and the integrity and majesty of the law would have been unassailed. The same spirit reigns to day that existed two weeks ago, and were the authorities, either actually, or by confession or implication unable to stem the tide of ruin, similar scenes would be re-enacted. The riot was evidently planned before-hand, and carried out upon some basis of co-operation; not effectually, as of course it could not be. In proof of this statement we can cite personal knowledge of inflammatory telegrams dispatched from this city to the towns adjoining, which were pre-eminently calculated to cause trouble, and incite resistance to the lawfully constituted authorities. The panic which reigned here supreme for the first three days, extended also to the rural districts; but was promptly met by the energy of the authorities. It could as easily have been disposed of among us, had not incompetency, or something worse, left the city undefended.

Of the political character ascribed to the mob we say nothing, because words are worse than useless on that head. If there was any deep-seated determination on the part of the rioters to deter the Government from carrying out the conscription, the futility of such a course is fully apparent now. We do not believe, however, that any such animus con-

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trolled them; and as for the assertion that the rioters were composed of mechanics, we utterly deny it. Our mechanics as a body, are notoriously intelligent, thinking men; and because a few laborers from the foundries turned out, or were forced to, by the most turbulent, the whole mob has been characterized as a popular outbreak of workingmen. Men who sweep our streets and dig dirt are not mechanics; and it is a libel on the most industrious class of our citizens to say that they formed any considerable portion of the lawless crowd. The real source from which the rioters were encouraged and recruited, was, and is, the mobs of young men who stand about street corners; without any special means of support they are yet dressed in the extreme mode, talk loudly, insult women, and are an unmitigated nuisance. Why they are permitted to thus congregate is a mystery to all well-disposed persons.

The mob who raged uncontrolled during the memorable week past, have had their counterpart in days bygone in large cities abroad; and the fiendish spirit which animated them has been as savagely exhibited in the past as it was but recently. Atrocities of the most appalling kind, wholesale plunder, and indiscriminate destruction, are necessarily the results of mob rule. Let not the lesson be lost upon the authorities here and elsewhere. Mercy to the riotously disposed, is but an encouragement to them to continue their misdeeds; and the only alternative is to meet force with force, and violence by an unrelenting exercise of the full power of the law. Even yet we are told that the riot is not quelled, but has only subsided; and that upon any attempt to carry out the conscription, all the scenes of the last outbreak will be renewed. These threats will not, we trust, deter the authorities from executing the law to the letter. The thunder mutters in the distance, long after the storm has passed; so the turbulent threaten after their power to injure has left them. Watchfulness and determination are yet imperatively necessary; and if these are exercised we have no fear that any renewed lawlessness will again disgrace our city.

EXPERIMENTS WITH BOILING WATER.

Some very remarkable observations on the ebullition of water were made several years ago by Professor Donny of Ghent. An account of these was published, and attracted general attention; especially as it was then stated, for the first time, we believe, that water deprived of atmospheric air exploded at a comparatively low temperature. The attention of Mr. W. R. Grove, F. R. S., having been directed to the subject, he has made a large number of experiments with boiling water, of which he lately gave an account before the Chemical Society of London. He placed a flask containing hot water under the receiver of an air-pump, and arranged in connection therewith a platinum wire, which could be heated to a tolerably constant temperature beneath the surface of the water, by a galvanic battery. When the air was exhausted, ebullition occurred at intervals of about a minute, upon which a burst of vapor would almost eject the contents of the flask. On this action increasing, the water would again become perfectly tranquil, and remain so for a minute, when another tumultuous ebullition would occur, to be succeeded by a period of rest; and the same phenomena would be repeated at such regular intervals, that the apparatus might almost serve as an indicator of time. If a thermometer were placed in the flask, it would be found that the temperature alternately rose and fell some few degrees. Indeed it could not be asserted that the boiling point of water was constant, for it depended upon the amount of air in solution; and Mr. Grove believed that no one had yet succeeded in observing the boiling point of absolutely pure water.

As a proof of the difficulty experienced in entirely expelling the air (or dissolved gas) from water, he cited the following experiment:—A long glass tube closed at one extremity, was bent in the middle to nearly a right angle; the closed limb was then half filled with water, from which, by long boiling, the air was supposed to have been expelled; the remaining space in the tube was then completely filled with olive oil, and the open extremity was dipped into a small basin of the same. Heat was then applied to the tube until the water boiled, and this temperature was maintained for a considerable time. Each bubble of steam which left the surface of the water passed through the column of oil, becoming smaller and smaller during its ascent; but it never condensed without leaving a microscopic bubble of gas, which at length accumulated to such an extent that it could be examined. It was found to consist of pure nitrogen; and he had never succeeded in expelling the whole of this gas from the water. The evaporation of nineteen-twentieths of the water did not secure the remainder from being mixed with nitrogen. On boiling ordinary water, air containing a slightly increased proportion of oxygen was first driven off, the oxygen gradually diminishing until pure nitrogen was expelled. The avidity with which such water again absorbs air is remarkable. In the expressive words of Mr. Grove, "it sucks it up again almost as a sponge takes up water." By a slight modification in the apparatus, the experiment was repeated with mercury, instead of oil, in contact with the boiling water. It furnished a similar result.

A number of facts regarding the solubility of gas in water were finally enumerated. The general conclusion drawn from the experiments, was to the effect that water had a very powerful affinity for the gases of the atmosphere; that the oxygen could be eliminated by several processes, but the nitrogen resisted all attempts to expel it from solution; so much so that it might be doubted whether chemically pure water (i. e., a compound of the two elements, oxygen and hydrogen, only), had ever been prepared; and further, that ebullition (as applied to water), under all circumstances, consisted merely in the production and disengagement of bubbles of aqueous vapor, formed upon a nucleus of permanent gas. The question, therefore, was raised as to whether nitrogen is so absolutely inert a body as had formerly been supposed?

ANTIQUITY OF MAN.

The period of man's habitation on this globe, is a question which has lately attracted much attention, and caused great discussion among scientific men, and in the community generally. Not many years since, the opinion was very commonly entertained, based upon Scriptural chronology, that man first appeared upon the earth about six thousand years ago. The sculptured monuments of primeval civilization, as well as the history of all past ages, seem to supply evidence that man is but a creature of yesterday—a comparatively recent dweller on this sphere. Quite lately, however, some curious and interesting relics of pre-historic races have been discovered, which are received by many men of science as furnishing proof of a much higher antiquity than has been usually ascribed to the human race. It is in respect to these relics that the controversy is now raised. We give a *resumé* of the argument—first presenting the subject as it has been understood geologically.

The various strata which compose the crust of the earth appear to have been formed at different periods of time, under different conditions, and of different materials. In one class of rocks, certain fossils are found; in other strata placed above these, different fossils are discovered; and so the paleontological remains continue to vary in the different strata, from the elder to the more recent formations. Geologists do not pretend to tell the exact ages of these successive stratifications; but it is generally believed that great epochs of time—hundreds of thousands of years at least—were necessary to their formation. The ancient seas, lagoons, and swamps, swarmed with strange creatures—mollusca and reptilea—and the dry land occupied for ages by numerous races of animals which in time became extinct, to be replaced by new and higher creations. Fossils of the elephant and rhinoceros have been exhumed from the chalk beds of London, and the clay beds of New York, among which no human remains were found. And thus the general testimony of geology has been regarded as favoring the view which recognizes man as a comparatively modern denizen of the globe; and that his advent occurred only some six thousand years ago. The later discoveries which militate against this theory respecting which some of our religious periodicals have declaimed with greater zeal than knowledge, are of a peculiar character. To these we will direct attention in scientific order; leaving the facts to make their own proper impression.

The diluvium, or drift, of geologists, consists of deposits of clay, sand, gravel, boulders, &c., extending over a great portion of the earth's surface—from the Polar regions to about 38° latitude, north and south. At one time these were supposed to have resulted from the Noachian deluge. The formation of these diluvial deposits is believed to have preceded the extinction of the *mastodon giganteus*—the bones of which have been found exhumed from bogs on the surface of the drift, in New York and New Jersey. The diluvial deposit containing these remains has been identified on both sides of the Niagara Valley; where it could only have been deposited—according to Sir Charles Lyell—before the chasm was made in the river. By his calculations, the drift period cannot approach to within 30,000 years of the time commonly assigned for the introduction of man upon the earth.

The facts seemingly opposed to such a view are as follows:—A few years since, M. Boucher de Perthes—a French investigator—while examining the gravel-beds of the Somme, France, which have been considered as belonging to the diluvian period—found a number of rude flint hatchets, and spear and arrow-heads. The publication of an account of his discoveries led to similar searches in England, and other parts of Europe; when many relics of the same character were found, mixed, in some cases, with bones of the northern elephant and other animals, which were supposed to have become extinct before man appeared on the globe. Here was apparent evidence, at least 30,000 years prior to the historic period! But some doubt still hovered over this testimony to the great antiquity of our race, no human remains having been observed with the old flint instruments. Such remains, however, have at last "turned up," M. Perthes having discovered a human jaw in the supposed diluvium near Abbeville, France.

The news of this discovery caused intense excitement among the *savans* of Paris and London: and four deputies from the latter city, viz: Mr. Prestwich, Mr. Busk, and Drs. Falconer and Carpenter went over to Paris on the 9th of last month, for the purpose of holding an inquest on this ancient relic of humanity, in conjunction with five members of the Institute of France. When first examined, it was in the condition in which it was when obtained from the gravel-bed, and was considered to be the jaw of an old man of low stature, of a type similar to the Laplander. After a photograph of it had been taken, it was washed, and sawn through the middle. The walls of the bone, and the single tooth remaining, looked so fresh that some doubt was cast upon the genuineness of the discovery. On the suggestion of the president, the commission proceeded to Abbeville, for their own satisfaction, and examined the deposit where the jaw was found. Old flint hatchets and other instruments were there exhumed before the wondering eyes of the members, many of whom were thus convinced of the reliability of the statements made by M. Perthes. But even this was not received by all the assembled *savans* as conclusive proof of the great antiquity of mankind: a different effect was produced. In a published note on the subject, Dr. Falconer says of this venerable memento of the past:—"The character which it presents, taken in connection with the conditions under which it lay, are not consistent with the said jaw being of very great antiquity." When the subject was brought before the French Academy of Science, M. Elie de Beaumont—one of the commissioners—went further than Dr. Falconer, and stated that in his opinion the gravel deposit where it was found did not belong to the diluvian age at all, but was of a more modern date; and that he did not believe in the existence of man contemporaneously with the extinct elephant and rhinoceros of the diluvian era.

This is the position in which, viewed scientifically, the question of the antiquity of the human family now stands. But whatever the result of such investigations may be, it is a singular fact that no human remains of the ante-deluvians spoken of in Scripture have yet been discovered. This circumstance should lead investigators to pause, and not be too hasty in

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attributing such an age as 30,000 years to the relics of our race, whether discovered in the diluvial deposits of France or any other part of the world. We have examined drawings of the old flint arrow-heads of the pre-historic European races, and find that they correspond in similitude to the flint arrow-heads of the living aborigines of the American continent—particularly those inhabiting the regions in the Straits of Magellan.

SOME FACTS CONCERNING REPTILES.

Of old, when the waters that covered the earth had subsided, there were, according to tradition and the limited discoveries of geologists, left stranded amid the ooze and mud certain monsters or reptiles which were hideous and repulsive in form. These are said to have been *chelonians* or those belonging to the tortoise family; *saurians* or lizards and *ophidians* or serpents. Reptiles do not undergo any change of nature and are always air-breathers, although cold-blooded; they have neither mammæ nor breasts for suckling their young, nor yet hair or feathers. By the two former peculiarities they are distinguished from fishes and batrachians, and by the two latter from mammals or those which do not suckle their young, and from birds. Reptiles breathe air by lungs, like birds and mammals, but the pulmonary circulation is incomplete, only a part of the blood being sent to the lungs; while from the ventricles of the heart a mixed arterial and venous blood is sent to the other organs. The number of species of reptiles is set down at 2,000, or less than that of mammals or birds; most of them are terrestrial, but some, it is said, can sustain themselves in the air. Some reptiles live habitually in the water, swimming by means of flattened fins (as the turtles) or by a thin tail, as in crocodiles; others dwell in subterranean burrows.

Every degree of speed is found among reptiles, and while some are fitted for running over dry sand, others are better adapted to climbing trees or ascending smooth surfaces. The means of defense with which nature has provided reptiles are many, and, although their appearance is sufficient to terrify most animals, yet they are furnished with other safeguards, which render an attack upon them, to say the least, unpleasant. The crocodile and turtle are sufficiently protected against ordinary assaults; the agility of the lizard serves him well, for he darts into his hole at the expense, possibly, of his tail, which is soon reproduced. The great boas can prevail over every foe but man, and the poisonous fangs of other serpents and the bristling spines of the horned lizard are amply sufficient to guard them from the attacks of predaceous and other ill-disposed members of the animal kingdom. Reptiles are very useful to man in various ways; some fulfill the law of their being by catching insects, while still others serve as food, or supply material useful in the arts. The muscles of reptiles are red, though paler than in mammals and birds; they preserve their irritability for a long time after death. Tortoises have been known to live eighteen days after their brains have been removed. Life seems in a marked degree independent of the brain, as they vegetate rather than live; and being comparatively insensible to pain, they grow slowly, live long, and are very tenacious of life. The sense of touch is dull, whether exercised by the skin, toes, lips, tongue or tail; taste must also be dull, as the food of reptiles is swallowed without mastication. Reptiles eat and drink comparatively little, and are able to go a long time without food; most of them are oviparous, their eggs being hatched by the heat of the sun. The young when born are able to provide for themselves, and are generally indifferent to the mother, who has neither the joys nor the sorrows of maternity.

THE REACTION.

As was natural under the circumstances, immediately upon the restoration of law and order in this city, benevolent citizens, pitying the abject condition to which the colored population had been reduced, set about raising a fund to relieve their immediate wants, and to see those who were unable to help themselves properly provided for. All classes of our citizens have vied with each other in this act of charity, and men of all political creeds (among them Hon. Thurlow Weed who generously gave $500), have nobly responded to the call made upon their generosity. Eminent merchants of this city have made speeches, voted money, and adopted resolutions promising relief and protection to the colored people, who stand in sore need of it. To this material aid, may be added the offers of assistance made by the first lawyers in New York to the outraged and despoiled negroes. The city and county are as liable for damages inflicted on the colored people of this metropolis, as they are for all other losses suffered by our citizens during the late riot, which amount in the aggregate to $447,100. It is the intention of the lawyers aforesaid to prosecute the claims of any colored person who may desire it, without delay, and without charge. The Produce Exchange have also taken prompt and creditable action in the matter. The sums now subscribed already amount to many thousands of dollars, and there is no question but that the money will be judiciously applied. This energetic and philanthropic action of the merchants and business men of the city, goes very far to redeem the stain cast upon our good name by the infamous acts of the rioters, and the miserable politicians who were concerned in the late demonstration. They will now see, and let them learn a lesson from it if they can, that the majority of the citizens of this metropolis, so far from siding with them in their acts of rapine and murder, instinctively loathe them, and hasten to relieve the sufferings of their poor victims by all the means in their power. The wildest savage that ever existed in Abyssinia would scorn to descend to the depths of depravity exhibited in this city during the late riot towards a helpless people, whose only offence was that their faces were not so white as those of the black-hearted assassins who attacked and murdered so many in our public thoroughfares. The relief extended toward the colored population has also been bestowed upon the families of those policemen and soldiers who died in the performance of their duty. To the bravery of these men we unquestionably owe our present security; and we are glad to learn that nearly $20,000 have been collected for this most worthy object. The daily press is full of accounts of the courage and efficiency of the Metropolitan Police force; and the high state of discipline which distinguishes it, with the appearance of the men, individually and as a body, amply bear out the encomiums lavished upon them.

INTERNATIONAL COMPETITION OF STEAM FIRE ENGINES.

A series of important trials with steam fire engines took place at the Crystal Palace, near London, on the first three days of the present month. The engines were divided into classes, consisting of machines not exceeding 60 cwt. (6,720lb) in weight, and over 30 cwt.; and smaller engines not exceeding 30 cwt. (3,360lb) in weight. The premiums consisted of £250, and £100 for the first and second best engines of each class. The conduct of the competition and awarding of the prizes, were under the management of a number of noblemen and gentlemen, the Duke of Sutherland being chairman; and some of the ablest engineers and practical mechanics in England were on the committee, among whom we notice Messrs. Fairbairn, Nasmyth, Maudsley, Crampton, McConnel, and Appold.

The contest was open to the steam fire engines of all nations. Six English, and three American, engines were entered. Shand, Mason, & Co., entered one of each class; as also did Messrs Merryweather & Sons. Easton, Amos, & Son, entered a large engine; and W. Roberts, one of 37 cwt., which had to compete with the large ones, though about one-third lighter. The American engines were the "Victoria" (large class), and the "Alexandra" (small class), built by the Amoskeag Manufacturing Company, at Manchester, N. H.; and the "Manhattan" (large class), built at New York—belonging to Messrs. Lee & Larned. This fire engine unfortunately met with an accident, from being overturned on the day prior to the trials, by which it was partially disabled, and was unable to compete on fair terms with its antagonists.

Two of the principal objects to be ascertained by the trials were—the quantity of water discharged in a given time—and the distance it could be thrown by each engine. A set of targets and tanks were prepared for the purpose. These targets consisted of canvas hoods having openings six feet in diameter, with a conduit attached to each, through which the water was conducted into a gaged tank standing below, and from which the quantity delivered within the opening of the target could be read by means of a graduated index. The committee were also to take into consideration the general efficiency of the engines: such as rapidity in raising the steam; the quantity of water delivered in a given time; also the simplicity and apparent durability of the mechanism.

On the first day, five engines of the first class competed; making two trials, and elevating the water into a tank 80 feet in height, through 60 feet of hose. They were to commence when the steam was raised to 100lb pressure. Shand, Mason, & Co's. and Merryweather's, were the most successful in filling the tanks in the shortest space of time after the fires were kindled. The "Alexandra" was the American machine which competed on this occasion. Easton, Amos, & Son's engine did well on the first trial; but the former was injured and it was withdrawn. Three engines of the second class competed, in ten trials, on the first day, viz: one of Messrs. Shand, Mason, & Co's, one of Merryweather's, and the "Victoria"—American. The engine of the first company filled the tank first on both occasions.

At the second day's trial the ordeal was that each engine should work for two hours without stopping, drawing its supply of water 18 feet, and forcing it through 500 feet of hose, laid up a steep incline to the top of the water cascades of the Crystal Palace. It is stated that the "Victoria" was unable to accomplish this achievement; and that Messrs. Shand & Mason's, and Merryweather's went through with the trial.

On the third day, the engines competed in throwing vertical streams. The "Victoria," it is stated, was not in proper order, and only threw a stream to a height of between 60 and 100 feet; while Shand's engine threw a steady stream to an elevation of 190, Merryweather's 170, and Roberts' 140 feet. A great victory is claimed by the English papers for the English engines; but the committee had not reported nor the prizes been awarded when the steamer which brought this news of the trial left Liverpool. In all probability, their report will modify the florid account given by the London *Times*.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

Gold and Silver Amalgamator and Pulverizer.—The object of this invention is to obtain a device of simple construction, which will cause a thorough incorporation of the quicksilver with the pulp containing the metal, so as to insure a perfect amalgamation of the former with the latter. To this end the invention consists in the employment of a pan provided with a bottom, having on its inner or upper surface a series of curved plates, so shaped and disposed as to form curved grooves which extend from its center to its periphery, and using in connection with the bottom, thus provided with plates, a rotary muller having similar plates on its under or face side, but placed in a reverse position; said muller also being provided at its edge with spiral flanges and hung upon its shaft by an universal joint. There are also attached to the inner side of the pan, spiral flanges, similar to those on the edge of the muller, but having a reverse position thereto. The invention also consists in the employment of curved plates which are placed in the pan just above the muller, and arranged in such a manner as to be capable of being adjusted higher or lower. By means of the rotary muller and the bottom of the pan, the pulp is made to pass in a continuous current, or flow over the top and underneath the muller so as to insure a perfect or thorough amalgamation of the metal contained in the ore with the quicksilver, while the curved plates are designed to prevent the pulp or ore being thrown out from the pan by the centrifugal force generated by the rotation of the muller. Zenas Wheeler, of San Francisco, Cal., is the inventor of this improvement.

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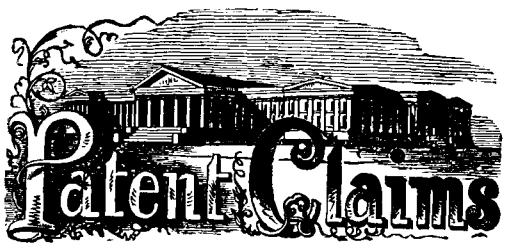
Corn-cutting Machine.—This invention relates to a new and improved machine for cutting up standing corn stalks on the field, and consists in the employment of a rotary cutter wheel fitted within a swinging frame which is provided with an adjustable weight, in combination with a supplemental swinging frame which is connected to the swinging cutter frame, both of the swinging frames being suspended within a frame mounted on wheels. The invention also consists in the employment of gathering-hooks in connection with springs; and further, in the employment of a windlass attached to the main frame of the machine, for the purpose of raising the swinging frames, and elevating the rotary cutter above the surface of the ground when said cutter is not required for use; as, for instance, in drawing the machine from place to place, in turning the same, &c. G. W. Cole, of Canton, Ill., is the inventor of this improvement.

Hemp Machine.—This machine relates to an improvement in that class of hemp machines which are principally used for the purpose of dressing the leaves of the *agave Americana*, and other plants of a similar nature. The invention consists in the employment of a cone drum carrying a series of combs and working within or under a cone cap, in such a manner that by the gradually increasing speed of the surface of the cone, from the small to the large end of the same, the leaves are caused to roll over the entire surface of the several combs, and the fiber is completely cleaned and discharged from the machine without difficulty; the invention consists, further, in the employment of combs with teeth of gradually increasing fineness, from the small toward the large end of the cone pulley, for the purpose of producing the best possible action of said combs on the fiber; and the invention consists finally, in giving to the feed rollers an oblique position in relation to the main shaft of the drum, in such a manner that, by the action of said rollers, the leaves are forced from one end of the drum toward the other, and the fibers are prevented from being retained in the same teeth of the combs, from beginning to end of the combing operation. George Ehrsam, of 76 Elm street, New York, is the inventor of this improvement.

Machine for cutting and boring Rock.—Heretofore the boring of rock has been generally accomplished by the use of a chisel, punch, or boring bar operated by percussion. This invention consists in a boring tool composed of a series of diamonds attached to an annular or tubular stock or crown of steel or other metal, to which a rotary and a direct forward motion are given, and which is thereby caused to cut or bore an annular groove or hole, leaving a central core or kernel which is easily detached by the subsequent operation of a gad or wedge, the quantity of matter required to be removed by such boring tool being very small in proportion to the cavity which is formed after the withdrawal of the said kernel or core. The advantage of this boring tool is, that it may be operated with a small amount of power, is expeditious in its action, and its wear is almost imperceptible in operating upon the hardest substances. J. R. Leschot, of Paris, France, is the inventor of this implement.

Wagon pole Check-arrester.—Almost every person has noticed the annoyance and distress experienced by horses when drawing a wagon over rough and uneven roads, occasioned by the incessant twitching and jerking of the pole laterally; this occurs, especially, when the wheels suddenly descend into gullies, or strike abruptly against stones or ridges in the road—the sudden vibrations of the pole jerking the horses first in one direction, then in another, galling their necks, and sometimes producing strain almost sufficient to throw them off their feet. This invention seems well adapted for obviating such difficulties. It consists in applying a spring to each hold-back chain or strap, which is arranged in such a manner that the chains or straps may perform their usual functions, and still be capable of yielding sufficiently to prevent, or ease, in a great measure, the violent jerking of the draught pole. The invention is simple, and easily attached to any harness, and we have heard it recommended in high terms by those who have used it. James McNamee, of Easton, Pa., is the inventor of this device.

Punching Machine.—This invention consists in the combination of two punches with the same driving mechanism, in such manner that they may be adjusted at different distances apart, to provide for the punching of plates of various widths at opposite edges simultaneously. It also consists in the employment, in combination with two such punches, of an intermittently moving carriage, so arranged as to present the plate to be punched to both punches, in such manner as to cause the punching of the holes in both edges of the plate at the required distance apart. It also consists in certain means of moving the plate carriage in different curves, for the purpose of punching the holes in curved lines, to suit the curvature of the edges of the plates required in making a boiler in conical sections. And it further consists in certain means of producing a variable feed of the carriage. H. W. Bill, of Cuyahoga Falls, Ohio, is the inventor of this improvement.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JULY 14, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

39,206.—Screw-driver.—J. A. Ayres, Hartford, Conn.:

I claim, first, A screw-driver, formed or composed of a shank, B, slotted longitudinally and provided with a set screw, C, and a detached or removable bit or turn-screw, D, substantially as set forth.

Second, Having the bit or turn-screw, D, provided with two prongs, b b, formed by slotting the bit or turn-screw longitudinally with a lateral projection, c, or an equivalent device or arrangement, so that the prongs will be thrown out of line with each other by screwing up the set screw, C, made to bind in the slot, f, of the screw, substantially as herein described.

Third, The reversible bit or turn-screw, D, provided at one end with the two elastic or yielding prongs, b b, and at the other end with the ordinary turn-screw, a, so that either may be used as desired.

[This invention consists in the employment of a bit or turn-screw and a shank, constructed and arranged in such a manner that the bit or turn-screw may be readily and firmly secured in the shank, and the former rendered capable of being firmly secured or held in the slot of the screw, so that the latter may be made to enter the wood, and screwed into it without the application of the hands to the screw. The bit is so constructed and arranged as to be reversible, one end being formed in the ordinary way, or like a common screw-driver or turn-screw, and the other end being constructed in a novel way so as to bind in the slot of the screw.]

39,207.—Sewing Machine.—C. W. Baldwin, Boston, Mass.:

I claim the vibrating bars or levers, N and O, as operated by the eccentrics, F and G, by means of the bands, H and I, the rods, J and K, and the studs, L and M, or their equivalents, in combination with each other and with the loops or lower needle, operated as above described and for the purpose herein set forth.

39,208.—Bottle-stopper.—Chas. F. Baxter, Boston. Mass. Ante-dated Jan. 16, 1863:

I claim, first, an elastic stopper, having a hollow or cavity opening into the end entering the bottle, substantially as shown and described.

Second, I claim the combination of a stopper having said cavity opening into the end entering the bottle, b, and shoulder or enlargement, c, substantially as shown and described.

Third, I also claim the combination of a stopper having said cavity in the end described, and shoulder or enlargement, with a bottle having a corresponding groove, d, substantially as shown and described.

39,209.—Punching Machine.—H. W. Bill, Cuyahoga Falls, Ohio:

I claim, first, The combination of two punches with the same driving mechanism, in such manner that they may be adjusted at different distances apart, to provide for the punching of plates of various widths at opposite edges or in two lines simultaneously, substantially as herein described.

Second, The employment, in combination with two punches adjustable at different distances apart, of an intermittently-moving carriage, so arranged as to present the plate to both punches in such manner as to cause the punching of the holes in both edges of the plate, or in two rows at a desired distance apart, substantially as herein specified.

Third, The employment, in combination with two punches, arranged as described, for guiding the movement of the plate carriage in straight or curved lines, as may be described, of a variable system of guide rollers operating in combination with a straight or curved rack, or a straight or curved groove or its equivalent, on or in the carriage, substantially as herein set forth.

Fourth, The employment for producing a variable feed movement of the plate carriage, of a rack with radiating teeth, as shown in figure 6, and a laterally movable pawl, operating in combination with such rack, substantially as herein specified.

39,210.—Apparatus for tempering Umbrella Ribs.—A. S. Black, New York City:

I claim, first, constructing the tempering die with a square hole, corresponding in size to the wire to be tempered, in order that the wire may be straightened in all directions, and the flattened portions of the wire be brought on line with each other, as and for the purposes specified.

Second, I claim constructing the tempering die with grooves, in one of the half pieces coming opposite the flat surface of the other half piece, whereby the tempering dies are more easily made and kept in order, as set forth.

Third, I claim the tempering dies, constructed substantially as specified, and inclosed in a suitable casing in combination with gas burners, applied substantially as shown, whereby the temperature of the said tempering dies is easily regulated and maintained with uniformity, as set forth.

39,211.—Skid for discharging and loading Vessels.—Robert Bragg, San Francisco, Cal.:

I claim the construction and application of the circular arc, B, as attached to the skid, A, operating substantially as described and for the purposes set forth herein.

39,212.—Washing Machine.—A. G. Brown, Lima, Ohio:

I claim the combination of a stationary washing tub with a reciprocating washing board under the arrangement, and for operation substantially as herein set forth.

39,213.—Manufacture of Alkaline Carbonates.—Lasslo Chandor, New York City:

I claim, first, The formation of the carbonates of potash and soda by the transformation of the sulphurets of potassium and sodium into bicarbonates of the same bases, by the process and substantially in the manner described.

Second, The manufacture of the sulphuret of sodium by the decomposition of the sulphuret of barium, substantially in the manner described.

Third, The manufacture or production, by the process described, of the sulphate and carbonate of baryta.

Fourth, The use of limes for the purpose and in the process described.

39,214.—Corn-stalk Cutter.—G. W. Cole, Canton, Ill.:

I claim, first, The combination of the two swinging or adjustable frames, E F, attached to the frame, A, and to each other, as shown, and provided respectively with the cylinder of cutters, H, and the foot-board, G, arranged substantially as and for the purpose herein set forth.

Second, The adjustable bar or weight, I, applied to the frame, E, substantially as shown and used in connection with the curved rod, J, staple, f′, and pin, h, or an equivalent fastening, for the purpose herein set forth.

Third, The adjustable hooks, N N, in combination with the springs, O O, arranged substantially as and for the purpose set forth.

Fourth, The windlass, L, applied to the frame, A, in combination with the frames, E F, for the purpose specified.

39,215.—Machine for loading Hay.—Gorden Constable, Canonsville, N. Y.:

I claim the sliding endless rakes, E E, in the framing, A, in combination with the pinions, d*, on the axle, D, of the wheels, B, all arranged to operate substantially as described.

I also claim the roller, L, fitted between the lower ends of the rack bars, l l, arranged substantially as shown, when said roller is used in combination with the endless rakes, Q A′, and the wagon, J, for the purpose specified.

I further claim placing the rake, Q, in a vertically adjustable frame, P, arranged as shown, to admit of the adjustment of said rake relatively with the ground, as set forth, and also for the purpose of rendering it operative, as described.

[The object of this invention is to obtain a machine by which hay may be raked up from the field, and deposited upon a wagon as the latter is drawn along, all the working parts being operated from the traction wheels of the machine.]

39,216.—Projectile for Rifled Ordnance.—H. E. Dimick, St. Louis, Mo.:

I claim the construction and shape of the steel and wrought-iron front, in combination with the lead and cast-iron portion, as arranged with the bands, N and P, for the purpose of giving the projectile perfect rotation, and making it more certain in its action, as herein described.

39,217.—Buckle.—Frank Douglas, Norwich, Conn.:

I claim the swinging frame, A, in combination with the stationary loop, e, socket, B, and tongue, D, substantially as herein specified.

39,218.—Defensive Armor for Marine and other Batteries.—J. B. Eads, St. Louis, Mo.:

I claim the employment of the angle-iron bars, g, in combination with the armor plates, E, and dowel pins, f, constructed and arranged as herein described and represented, for securing the armor of war-vessels, and making a system of breaking joints, substantially as herein set forth and represented.

39,219.—Hemp Machine.—George Ehrsam, New York City:

First, I claim the employment or use of a conical drum, A, carrying a series of combs, F, and working within or under a cone cap, G, in the manner and for the purpose substantially as herein shown and described.

Second, Discharging the clean fibers over the large end of the cone drum, A, through the open side of the cap, G, in the manner and for the purpose substantially as specified.

Third, Making the teeth of the combs, F, of gradually-increasing fineness, from one toward the other end of the drum, as and for the purpose set forth.

Fourth, Giving to the feed rollers an oblique position in relation to the main shaft of the drum, substantially as and for the purpose specified.

39,220.—Machine for dressing Chair Backs.—S. L. Fitts, Ashburnham, Mass.:

I claim, first, The reciprocating segment bed, E, placed on the adjustable way, B B, and operated substantially as shown, in combination with the pressure rollers, M M, and the rotary cutter, N, all arranged as and for the purpose specified.

Second, The arrangement and combination of the shaft, X, provided with the cams, Y Y, the arm, W, pawl, V, ratchet, U, the levers, P A′, cam, T, socket, R, with pin, Q, the spring, i, on the journal of the cutter, N, and pins, l l, at the side of the bed, E, all arranged as and for the purpose herein set forth.

[This invention consists in the employment of a reciprocating segment carriage placed on an adjustable bed, in connection with a rotary and vibrating cutter head and pressure rollers, all arranged to effect the desired end.]

39,221.—Beehive.—W. A. Flanders, Shelby, Ohio:

I claim, first, The semicircular comb frames, A, in combination with a semicircular case, B, arranged as and for the purpose specified.

Second, I claim the sand board, E, which forms a partition between the comb frames and honey boxes above, constructed as and for the purpose set forth.

Third, I claim the moth traps, F, in combination with the adjustable bottom board, G, arranged and operating in the manner and for the object described.

Fourth, I claim the adjustable front entrance, H, in combination with the moth box, I, arranged and operating as specified.

39,222.—Adding Machine.—G. B. Fowler, Chicago, Ill.:

I claim the arrangement of the apertures, b, in the under side of the platform or bed, A, to operate in combination with the figures on the underside of the slides, B, and with said slides, strips, C, and caps, D D′, in the manner and for the purpose herein shown and described.

[An engraving and full description of this invention will be published in the SCIENTIFIC AMERICAN in a few weeks.]

39,223.—Lock and Bolt.—E. O. Brink and C. E. McDonald, Indianapolis, Ind.:

We claim, first, The bolt, F, when the same is constructed and operated substantially as set forth.

Second, The knob, S S, when the same is constructed and operated substantially as set forth.

Third, The annular plate, E, and the bent wire, b b′, when the same are constructed and operated substantially as set forth, or any other substantially the same.

Fourth, The escutcheon tube, 18, when the same is constructed as aforesaid, combined with the said key, No. 12, and the said spring, k k, otherwise substantially as set forth.

Fifth, The said key, No. 12, when the same is constructed and operated in manner and for the purpose as aforesaid, or any other substantially the same.

Sixth, The said cylindrical slide, No. 10, with its springs, h and k k, when the same are constructed and operated substantially as set forth.

Seventh, The shank, A A′, of the said knob, S S, when the same is constructed and applied substantially as set forth.

Eighth, The said file-faced tumbler, l l′, when the same is constructed and operated substantially as set forth.

Ninth, The slot, z z, of the said escutcheon tube, when constructed and applied substantially as set forth.

Tenth, The lock, as a whole, when the same is constructed and operated substantially as set forth, or any other substantially the same.

39,224.—Carriage Spring.—C. B. Galentine, Brooklyn Center, Ohio:

I claim the application of a self-adjusting triangular brace to land carriages, in such a manner as to retain the parts of the springs and their attachments in their proper relations, and thus to secure the parts from undue strain or breaking by the motions of the carriage.

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39,225.—Churn.—Samuel Gissenger, Alleghany City, Pa.

I claim the combination of the pump, dashers and breakers, when used in connection with a churn, and operated in the manner and by the means described, and for the purpose set forth.

39,226.—Molding-machine Feed.—Lyman Gould, Norwich, Conn.:

I claim, first, The raising the feed rolls combined, each end independent of the other, by the use of the crank screws, M and K, by which the rolls are tilted to any required angle from a horizontal position, in order to bear on beveled stuff, to feed it through under the rolls and cutters.

Second, The combination of the frame, B, with the columns, C C C C, the top-frame, S, the bolts and nuts, b b b b, with the arrangements for holding, guiding, and giving pressure to the rolls, substantially as and for the purposes specified, the whole forming a neat and convenient frame for use in the manner and for the purposes herein specified.

Third, The arrangement of the boxes, D D D D, the spring, G, and the rods, N N, sliding in the slots, P P, to adjust themselves to any position of the rolls.

39,227.—Manufacture of Illuminating Gas.—W. H. Gwynne, White Plains, N. Y.:

I claim carbonizing hydrogen gas, by passing it through a sufficient quantity of anthracite coal to render it fit for illuminating purposes, substantially as described.

39,228.—Cut-off Valve Gear for Steam Engines.—J. F. Hamilton, Pittsburgh, Pa.:

I claim the arrangement of the regulating arms, h, lifters, i, spring, g, frames, m and c, arms or levers, j and n, when used in connection with the governor and rock shaft or eccentric of engines, the whole being arranged, constructed and operating substantially as herein described, and for the purpose set forth.

39,229.—Variable Cut-off Valve Gear for Steam Engines.—J. F. Hamilton, Pittsburgh, Pa.:

I claim the arrangement of the lifters, j, triggers, k, spring, l, regulating arms, h, arms or levers, m and n, and link, d, when used in connection with a governor and rock shaft or eccentric of engines, the whole being arranged constructed and operating substantially as herein described, and for the purpose set forth.

39,230.—Baling Press.—Jacob Harder, Lock Haven, Pa.:

I claim operating the follower, B, through the medium of the lever, D, provided with the sliding pawls, h h, and connected to the follower rod, C, by a joint, the pintle, f, of which works in sinuous grooves, d d, between racks, c c, arranged one above and the other below the follower rod, C, substantially as and for the purpose herein set forth.

[This invention consists in operating the follower of a press box through the medium of two double racks with a sinuous groove between them, in connection with a lever provided with two sliding pawls, arranged with springs and connected to the outer end of the follower rod by a hinge or joint, the pintle of which works in the sinuous groove between the two racks, all being so arranged that a good leverage power is obtained, and one that may be operated with facility.]

39,231.—Fence.—H. G. Hood, Harlan, Ind.:

I claim the arrangement with the battens, B B, slotted and notched as shown, and the boards or rails, a a, of the fastening pin, E, the beveled braces, D D, and ring, e, when all the parts are constructed as herein shown and described.

[This invention relates to an improved fence of that class which are designed for temporary erection, or to be readily put up and taken down, and are commonly termed portable fences. The invention consists in a novel and improved means employed for receiving the sections or planks of the fence together, and bracing the same and retaining it in a vertical position.]

39,232.—Breech-loading Fire-arm.—C. W. Howard, Hammonton, N. J.:

I claim the construction of the cylinder, C, with countersunk recesses at each end of the charge chamber, as herein shown and described, so that said cylinder, although rotating in one direction, may be loaded with cartridges at either end of the chamber, all as set forth.

I also claim the combination of the oscillating ratchet bar, k, lever, i j, and rod, h, with the hammer, F, and the ratchet wheel, t, in the manner herein shown and described.

[This invention consists in the construction of a fire-arm with a vertical cylinder having a single chamber extending directly through it at right angles to its vertical axis, and so arranged within a suitable block in rear of the barrel, that, by turning it to bring its chamber at right angles to the line of the barrel, it may be loaded at each end of the chamber alternately, and by the act of loading at each end, the discharged case or shell of the previously-inserted cartridge may be expelled at the other end. It also consists in a certain mode of combining such cylinder with the hammer of the fire-arm, whereby it is brought to the position for loading when the hammer is at half-cock, and for firing when the hammer is at full-cock.]

39,233.—Machine for making Cement Pipes.—John Howarth, Salem, Mass.:

I claim forming the exterior of the pipe, and holding and sustaining it while being so formed, upon its rod or shaft, by means of two lateral rollers, operating therewith substantially as described.

Also in combination with the two lateral rollers operating upon the pipe as described, I claim the top or third roller, l l, for the purpose specified.

39,234.—Grain Binder.—Josiah Judevine & Zebulon Shaw, Roxbury, Wis.:

We claim the arrangement of the gatherer, B, with spring jaws, d, pinion, a, segmental cog-wheel, b, and crank, c, in combination with the spool, C, scissors, D, and twisting mechanism, E, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

[The object of this invention is to produce a grain binder, which will enable two men to complete the binding of the grain as fast as the reaper will cut; one man being required to take the grain from the platform of the reaper to the gatherer of the grain binder, and the other to operate the different parts of the binder.]

39,235.—Tool for Boring Rock.—Rodolphe Leschot, Paris, France:

I claim the tool for boring or cutting rock or other hard substances, composed of an annular or tubular stock or crown, armed with a series of diamonds, and operating substantially as herein specified.

39,236.—Device for preventing Retrograde Motion in Sewing Machines.—Wm. F. Lewis, Watertown, Conn., and Joseph H. Baird, Waterbury, Conn.:

We claim the combination with a rotating hooked mandrel, C, for carrying the thread around a bobbin, D, of a ratchet wheel, E, and friction lever, F, provided with a pawl, d, constructed, arranged, and operating substantially as described, and for the purposes set forth.

39,237.—Hose or Tubing.—Thomas J. Mayall, Roxbury, Mass.:

I claim forming a hose or tubing, by first saturating or incorporating threads or strands of fibrous materials, rubber or gutta-percha, or compounds of either or both, and then weaving or braiding the same, substantially as set forth.

39,238.—Manufacture of Elastic Hose or Tubing.—Thomas J. Mayall, Roxbury, Mass.:

I claim a hose or tubing, in which the periphery of one or more of its layers is formed by weaving or braiding upon an inner tube or lining, an outer tube made of twine, wire, or other strands or threads, substantially as set forth.

39,239.—Chain Link.—James Packer, New York City:

I claim a chain link, A, made of two parts, B C, united by two swivels, D, in the manner and for the purpose, substantially as shown and described.

[This invention consists in a link made of two distinct parts, which are united by two swivels, which screw in the ends of the parts of the link in such a manner that in case an ordinary link of a chain breaks while the same is stretched and in use, one part of any link can be slipped into one, and the other part into the other link adjoining the broken link of the chain, and by drawing the two parts of the same together, the chain is restored without slacking it, or taking off the strain to which the same had been subjected previous to the parting of the link.]

39,240.—Amalgamator.—August F. W. Partz, Wurtsboro' N. Y.:

I claim, first, A current of mercury moving over a horizontal or inclined surface, upon which auriferous or argentiferous ores, or substances in a dry pulverulent state are distributed, to effect their amalgation as specified.

Second, I claim amalgamating gold and silver with mercury, by causing the former to come in contact with the latter, while passing in a thin strata over an inclined metallic plate or trough, the surface of which is amalgamated with mercury, the down-flowing mercury being drawn away from below the surface at the delivery end of the said plate or trough, and re-elevated to the higher end thereof, substantially as set forth.

Third, I claim a current of water or air in combination with a flowing sheet of mercury, for removing the tailings, the pulverized ore being distributed on such sheet in a dry state, substantially as specified.

Fourth, I claim agitating the tailings by means of rotating or oscillating stirrers or bauches, in combination with amalgamating machines in which the mercury flows in a thin strata over an inclined plate, in order that the said tailings may be easily removed, and the mercury be allowed to freely return to the point of beginning, substantially as set forth.

Fifth, I claim distributing auriferous or argentiferous ores, or substances in a dry state upon a moving sheet of mercury (for the purpose of effecting their amalgamation), by means of vibrating sieves or screens, substantially as specified.

39,241.—Straw Cutter.—John G. Perry, South Kingston, R. I.:

I claim, first, The cylinders provided with alternating knives, and projections, 3, when constructed as described, and for the purpose set forth.

Second, I claim a straw cutter having two or more of said cylinders, constructed as described, and working in combination in the manner and for the purpose set forth.

Third, I claim attaching the rolls to the frames of straw cutters, by means of dovetail, e, and recess, n, in the manner and for the purpose set forth.

39,242.—Hay Cutter.—John G. Perry, South Kingston, R. I. Ante-dated May 13, 1863:

I claim, first, The combination of the adjusting screw, S, gears, D C, and hub, o, with the cylinders, for the purpose herein set forth.

Second, I claim the combination of the lock with the hay cutter substantially as herein described, and for the purpose set forth.

39,243.—Meat Cutter.—John G. Perry, South Kington, R. I.:

I claim the combination of the slotted plate, S, with the knives, x x, substantially as herein described, and for the purposes set forth.

39,244.—Sausage Stuffer.—John G. Perry, South Kingston, R. I.:

I claim the combination of the cam, D, and plate, L, substantially as herein described, and for the purposes set forth.

39,245.—Water Elevator.—Stephen Puffer & Andrew J. Sands, 2d, Oxford, N. Y.:

We claim the longitudinally sliding, self-detachable crank, H, when arranged and combined with the toothed coupling wheel, G, of the windlass shaft, C, substantially in the manner and for the purpose herein set forth.

We also claim the self-detachable sliding crank, H, the toothed coupling-wheel, G, the windlass shaft, C, the rigidly united brake, lever, and pawl, L and M, the automatic, self-discharging bucket, N, and the windlass drum, E, of our improved water-drawing apparatus, when said parts are arranged and combined with each other substantially in the manner and for the purpose herein set forth.

39,246.—Breech-loading Fire-arm.—Westley Richards, Birmingham, England:

I claim the combination of the hinged cover and lever, c, carrying the sliding block, d, and its projection, d2, and pivoted or yielding plug, e, with the chamber, b, and its aperture, b', in the manner and for the purpose herein described and represented.

39,247.—Skate.—Jacob Frederick Schneider, Brooklyn, N. Y.:

I claim, first, The forked runner substantially as described.

Second, The wheel in combination with the forks of the forked runner, substantially as described.

Third, I claim securing the leathers within the two part stock, by means of the wires, f, and jogs in the recesses, g, in the manner specified.

39,248.—Paddle Wheel.—Francis B. Scott, Buffalo, N. Y.:

I claim, first, The bucket, C, attached to the arm, C', at any given angle thereto, the arms being hinged to the wheel near the pumping thereof, and geared by an eccentric, which is supported by the boat, for the purpose and substantially as described.

Second, Making the wheel with compartments, a1, leaving an open space, a2, between each, through which space the bucket advances and recedes, for the purposes set forth and shown in the drawings.

39,249.—Raking Attachment to Harvesters.—Benjamin Smith, Batavia, Ill.:

In combination with a rake that is operated by a crooked-necked crank, and a flexible or ball and socket connection, and rolled up upon a guide-piece, F, a self-connecting and disconnecting catch, I, that holds the rake up at certain intervals, and allows it to drop upon the platform, when about to clear it of the cut grain, substantially as described and represented.

39,250.—Sad Iron.—Nathaniel Waterman, Boston, Mass.:

I claim an improved smoothing or sad iron, as made not only with a round heel and a plane surface bottom and a pointed or angular toe, but with the sides making an angle with the bottom, and with the top or upper surface rounded at and above the toe and the heel, and both longitudinally and laterally, in manner as shown in the accompanying drawings, and substantially as described.

39,251.—Machine for Collecting Amalgam and Mercury from Ore Pulp.—Zenas Wheeler, San Francisco, Cal.:

I claim the tub, A, provided with the concave bottom, a, and chamber, b, in combination with the rotating pads, L, as and for the purpose specified.

I further claim in combination with the pads, L, concave bottoms, a, and chamber, b, of the tub, A, the tubular shaft, H, and arms, k, all arranged for joint operation, as and for the purpose specified.

39,252.—Machine for turning Umbrella Hooks or Handles.—Henry Winter, Honesdale, Pa.:

I claim, first, The revolving cutter-head with a gouge shaped cutter, and with a center opening that is flaring or trumpet mouthed on each side, for dressing curves or hooks on umbrella sticks and other articles, substantially as specified.

Second, I claim the mode of constructing the stock, a, and cap, c, for receiving and sustaining the rotating cutter head as set forth.

Third, I claim the adjustable fence, k, in combination with the revolving cutter-head, e, for the purpose and as specified.

39,253.—Hinged Collar for Lamps.—George F. J. Colburn, Newark, N. J., assignor to Lemuel Beers, Newtown, Conn.:

I claim, first, A hinged collar, a f, adapted for application between the lamp top, t, and neck, n, opening to a limited extent to afford direct access to the reservoir below the burner, and held in its open position by the weight of the chimney, all as herein shown and explained.

Second, The combination of the fastening, e, and handle, i, arranged and operating as specified.

[This invention is designed to obviate the necessity of displacing all or any of the fixtures of a kerosene lamp, in order to replenish the oil in the reservoir. By a very simple and cheap contrivance applicable to any burners now in use, a fresh supply of oil may at any time be introduced, even without extinguishing the light. An illustration and description of the invention will shortly appear in our paper.]

39,254.—Explosive Shells for Ordnance.—Thomas Harding, Springfield, Ohio, assignor to Thompson D. Hart, Philadelphia, Pa.:

I claim the combination of the grooved heads, A and B, tail-piece, C, stem, D, chamber, E, and flanged segments, F, when the whole are constructed and arranged as herein described, for the purpose set forth.

39,255.—Rice Cleaner.—Lucius D. Hawkins, San Francisco, Cal., assignor to Alfred Peabody, Salem, Mass.:

I claim the construction of the wire cloth covered frames, E, in two or more parts, and made adjustable substantially as set forth for the purpose specified.

39,256.—Sewing Machine.—Leander W. Langdon (assignor to himself and Daniel G. Littlefield), Northampton, Mass.:

I claim, first, Combining with the mechanism which gives the feeding motion to the feeder, I, a reversing lever, j, or its equivalent, by means of which the direction of the feeding motion of the feeder may be reversed, or the length of the stitches adjusted substantially as described.

Second, Combining with the mechanism which gives the feeding motion to the feeder; the catch lever, e, or its equivalent, operating substantially as described, by which the feeding motion is arrested at each alternate operation of the needle.

Third, Imparting the vertical or engaging and disengaging motion to the feeder, by means of the hook, T, substantially as described.

39,257.—Refining Ore.—John L. Constable, New York City:

I claim refining ores by the use of super-heated steam in a furnace, substantially in the manner described.

And I also claim the gage covered wheel, revolving partially in water, in the manner and for the purpose specified.

39,258.—Hay Press.—Levi Dederick, Albany, N. Y.:

I claim the arrangement and combination of the follower, with its beams projecting through the sides of the press, and the toggle levers located and operating at the sides of the press, substantially as and for the purposes herein specified.

39,259.—Pump.—Birdsill Holly, Lockport, N. Y.:

I claim, first, The valve ring or support, B, provided with the ribs, e e, or equivalent, and with one side, f, made lighter than the other, for the purpose of retaining said support in place in the cylinder, substantially as herein set forth.

Second, In combination with the support, B, and its valve, C, I also claim the thin raised valve seat, d, arranged substantially as described.

Third, I also claim the inclined, inductive valve, C, so formed that when tipped for the admission of the water, its upper surface will assume a horizontal position, or approximately so, substantially as herein set forth.

Fourth, In combination with the induction valve, C, I also claim the eduction valve, E, provided with a stem, r, and the piston, D, arranged and operating substantially as specified.

Fifth, I also claim the arrangement and combination of the piston, D, composed principally of the parts, i k, the valve, E, the piston rod, G, and nut, P, substantially as and for the purpose herein set forth.

39,260.—Hold-back for Wagons.—James McNamee, Easton, Pa.:

I claim the combination of the rod, C, spring, D, cross-bars, c g U-shaped link, B, chain, A, and ring, f, when the said parts are constructed and arranged as herein specified, and the whole employed as described, to arrest sudden lateral motions of the forward end of the tongue.

39,261.—Marking Brand.—George H. Strong, Buffalo, N. Y.:

I claim making the brand in two pieces, when one of the pieces is provided with flanges or projections, between which the other piece may be slid and then held fast by screwing in the handle, as herein substantially set forth and described.

39,262.—Grain Separator.—Henry B. Thomas, Cascade, Iowa:

I claim two or more concentric cubical vessels or boxes, the inner one perforate, and the outer covered with wire-gage or its equivalent, for separating different grains, substantially in the manner and for the purpose herein set forth.

39,263.—Dog Power.—Franklin Cole, Conesus, N. Y., assignor to Wm. P. Hendershott, Groveland, N. Y.:

I claim the combination of an inclined revolving platform, A, with an oscillating lever, O (by means of a regular series of projections, M M, upon said platform, and one or more friction wheels, N N', upon said lever, O, or their equivalents), substantially in the manner and for the purpose herein set forth.

I claim also the peculiar arrangement of the friction wheels, N N', in combination with an oscillating lever, O, and a regular series of projections, M M, upon an inclined revolving platform, A, substantially in the manner and for the purpose herein set forth.

39,264.—Hay Loader.—Cyrus B. Garlinghouse & John Dickason, Allenville, Ind.:

I claim, first, The floating hay carrier, I J, constructed, supported, and operating in the manner and for the purposes specified.

Second, Connecting the floating or self-adjusting carrier of a hay loading machine with the main frame, by means of vibrating arms, N N', journaled in line with the axes of the lower stretcher and the ground wheels, by which the lower end of the carrier is permitted to adapt itself to inequalities of the ground without affecting its connections with the driver substantially as specified.

Third, Combination with the self-adjusting or floating hay carrier, of fingers, F, variable in their pressure upon the ground, substantially as described.

Fourth, In the described combination with carrier, I J, and fingers, F, or their equivalents, we claim the provision of reciprocating rakes, W W', adapted and operating substantially as set forth.

39,265.—Transparent and flexible material designed as a partial substitute for Glass.—Christoph Sussegger (assignor to himself and Moritz Pinner), New York City:

I claim the manufacture and use of a transparent or translucent flexible fabric or material composed of wire webbing or its equivalent and a transparent coating or coatings, all substantially as herein set forth and described.

RE-ISSUES.

1,511.—Machine for gathering Hay.—F. F. Fowler, Crane Township, Ohio. Patented Jan. 22, 1861:

I claim, first, Connecting the side and cross-pieces of the machine together by flexible or yielding joints, so that either side of the machine may rise or fall in yielding to the inequalities of the ground, independent of the other side, substantially as described.

Second, I also claim constructing and combining the fingers with the runners, so that the rear under portions of the fingers shall also act as runners and supporters, and mutually aid, and be aided by, the runners proper in carrying the load, substantially as described.

Third, I also claim the combination of a hinged tongue, a twining finger bar, and the flexibly connected runners, so that as the machine is raised behind, it may roll down in front on the curve of the runners for the purpose of dumping or discharging the load, substantially as herein described.

1,512.—Car and Truck Connection.—Josiah J. Sherman, Albany, N. Y. Patented April 14, 1863:

I claim, first, The employment or use of balls, E, or rubbers, F', interposed between the trucks and the car body, in suitable boxes, when the said parts are constructed and combined, in the manner herein specified, so as to permit free motion of the car body laterally in either direction, and afterwards restore it automatically to its normal position.

Second, The combination of the annular springs, g, with the bearings, e f g h i j, or any of them, when arranged to operate in the manner and for the purposes herein specified.

Third, The combination of the annular springs, g, with the bearings, e f g h i j, or any of them, or the mechanical equivalent of said springs, when used in connection with the balls, E, or rubbers, F', to restrain or qualify their action, substantially in the manner herein set forth.

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Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from **$30** to **$15**. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions, in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have as the agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

Notes and Queries

L. M. B., of Mich.—Sulphate of potassa is the best mordant known to us for hair dye—using nitrate of silver as the coloring agent. Gallic acid is a disagreeable mordant. To clean a marble slab first use soap and whitening; then rub off and polish with a piece of leather. Iron stains may be removed from marble with a solution of oxalic acid; but it renders the surface of the marble rough.

W. W. D., of Conn.—The armor plates and turrets of the *Roanoke* weigh over fourteen hundred tuns, all of which has to be sustained by the framing of the vessel. The framing, however, is very strong.

R. H., of N. Y.—In making your currant wine, use about one pint of sugar to one quart of the juice of the currants, and watch the progress of the fermentation, daily, so as to check it at the right point. If you allow it to proceed too far, it will acquire a taste like vinegar flavored with smoke.

W. C. T., of N. J.—Some gardeners use a soft brush for removing aphides from rare and delicate plants, in cases where fumigation would be too troublesome. We advise you to try this plan for yours.

H. L. V., of Cuba.—The oscillations of the barometer are more limited in tropical than in northern climates, but they are just as regular. In Cuba a disturbance of the mercury, equal to that which occurs in the North before a slight thunder-storm, is a sure precursor of a terrific hurricane. By close attention to a barometer, you will discover this to be the case.

Note —At the time of going to press with our last issue we had the usual weekly lot of specifications, drawings and models, packed and ready to send to the Patent Office. But owing to the riotous turmoil raging in the city on that day, we were compelled to withhold the shipment for a day or two, until law and order were restored. This accounts for the absence from the last number of our usual list of acknowledgments. We believe it is the first occasion during fifteen years that an omission of this kind has occurred.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, July 8, to Wednesday, July 22, 1863:—

G. A., of Mich., $26; R. R. B,, of N. Y., $16; R. W., of Conn. $150; H. P., of Me, $25; J. S. G., of N. Y., $16; O. F. O., of Mass, $25; G. McG., of Ohio, $16; J. M., of Wis., $12; P. B., of Ill., $15; I. H., of Wis., $26; A. S., of N. Y., $16; B. and C., of R. I., $50; N. F. C., of Wis., $25; W. M., of Mass., $30; N. B. B., of N. Y., $16; J. T., of Wis., $65; W. McK., of Pa., $25; S. W. P., of Mass., $16; C. M. L., of N. H., $20; A. S. M., of Ill., $20; C. C. S., of Ill., $20; C. B., of Cal., $50; J. T. W., of N. J., $16; J. B. T., of N. Y., $20; J W. D., of N. Y., $36; J. P., of N. J., $41: J. G., of Ill., $20; S. S. A., of Mass., $20; T. R. T, of N. Y., $55; S. S. and D. C., of Ill., $20; W. T., of N. Y., $10; J. C. C., of N. Y., $314; S. and S., of N. Y., $16; C. D. S., of N. Y., $25; W. C. H., of Ohio, $25; C. D. B., of Mich, $25; J. W., of Ill., $40; F. M., of C. W., $16; J. H. C., of Ky., $25; M. and S., of Pa., $25; W. K. S., of Pa., $25; T. H. B., of Mass., $16; J. H. R., of Conn., $12; B. F. H., of N. Y., $25; H. B., of Pa., $16; C. D., of Mo., $25; A. J. A., of Ill., $15; R. H. L., of Pa., $20; O. H. K, of Saxony, $20; J. V. V. B., of N. Y., $41; C. F. B., of N, Y., $10; P. P., of N. Y., $30; A. C. C., of N. Y., $41; J. McH., of Ohio, $20; J. P., of N. Y., $10; S. and M., of Iowa, $20; H. H. J., of Conn., $20; M. W. W., of Mo., $16; J. J. R., of N. Y., $16; C. T. D., of N. J., $20; A. B., of N. J., $41; J. H. M., of Ind., $20: E. B. R., of N. J., $20; G. H. S., of Mass., $25; A. B., of Mich., $25; J. B. C., of Mass., $25; M. C. B., of Ill., $16; S. L. G., of N. Y., $25; B. L., of Vt., $133; I. E. P., of Conn., $30; J. K., of Iowa, $16; J. D., of Ill., $41; S. H. M., of Cal., $11; K. C. and R., of Wis., $10; R. F. W., of N Y., $30; J. C., of Maine, $20; T. L. C., of N. Y., $25; J. G. R., of Cal., $33; M. F. W., of Ill., $26; A. S., of Ill., $20; J. B., of Ind., $20; I. L., of N. Y., $20; O, P., of Vt., $20; A. and C. K., of N. Y., $41; F. D. B., of Ind., $20; J. H., of Cal., $41; C. R., of Mich., $20; A. K., of N. Y., $41; G. G. H., of Conn, $20; F. W. H., of Canada, $20; J. C., of Ohio, $20; L. and B., of Ohio, $51; A. M. M., of N. Y., $16; J. C. W., of N. Y., $20; T. S. T., of Ind., $20; J. H. L. T., of Ill, $20; O. A., of N. Y., $25; B. C. N., of Ill., $12; A. S., of N. Y., $15; J. V. V. B., of N. J., $25; J. P., of N. J., $25; A. M. M., of N. Y., $25; W W. T., of Wis., $15; J. W. K., of Mass., $25; H. E., of N. Y., $20; A. B., of N. Y., $25; T. B., of N. Y., $25; J. H. B., of N. Y., $25; J. T. W., of N. J., $25; T. R. T., of N. Y., $55; A. J. S., of Ill, $16; J. S. G., of N. Y., $25; A. C. F., of N. Y., $20; E. O. B., of N. Y., $25; R. F. W., of N. Y., $25; A. K., of N. Y., 25; F. J., of Wis., $25; J. W., of Iowa, $31; A. C. B, of N. Y., $10.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Pate Office from Wednesday, July 8, to Wednesday, July 22, 1863:—

A. and C. K., of N. Y.; A. B., of N. Y.; T. B., of N. Y.; P. M. R. of Cal.; A. S., of N. Y.; A. K., of N. Y.; A. M. M., of N. Y.; F. J., of Wis.; J. T., of Wis. (2 cases); C. D., of Maine; J. G. R., of Colorado Territory; P. S., of Mich.; J. H. K., of Conn.; C. D. S., of N. Y.; A. B., of Mich.; G. H. S., of Mass.; W. C. H., of Ohio; A. and M., of Wis.; I. H., of Wis.; A. C. C., of N. Y.; E. O. B., of N. Y.; B. C. N., of Ill.; J. H. B., of N. Y.; J. V. V. B., of N. J.; J. P., of N. J.; J. W., of Iowa; J. M., of Cal.; W. M., of Mass.; B. F. H., of N. Y.; N. F. C., of Wis.; J. H. C., of Ky.; S. L. G., of N. Y.; W. F. O., of Mass.; J. B. C., of Conn.; J. M., of Ill.; W. R. S., of Pa., G. A., of Mich.; J. W. D., of N. Y.; O. A., of N. Y.; R. F. W., of N. Y.; J. T. W., of N. J.; T. R. P., of N. Y.; J. W. K., of Mass.; J. S. G., of N. Y.; E. D. B., of N. Y.; M. F. W., of Ill.; W. McK., of Pa.; T. L. C., of N. Y.; R. and H., of Ohio; H. P., of Maine; C. D. B. of Mich.; W. M. B., of Ind.; M. and S. of Pa.; S. H. M., of Ill.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that are required to accompany the petition, specification and oath, except the Gover nme nt fee.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO., No. 37 Park-row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is served by a large class of its patrons, lawyers and others, for reference Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII. to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

Back Numbers and Volumes of the Scientific American.

VOLUMES I., II., III., IV., V., VII. AND VIII. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. VI. is out of print and cannot be supplied.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

A CHEMIST EXPERIENCED IN ALL BRANCHES OF manufacture and science, desires employment in a chemical or dyeing business. Can give the best of references. Address FREDERICK HOFFMAN, 178 Fulton street, New York. 5 2*

WAIT'S IMPROVED JONVAL TURBINE WATER wheel. The best and cheapest wheel in use. Heavy, strong and durable, adapted to all heads, easily set up and never gets out of order. Circulars sent on application. P. H. WAIT, Sandy Hill, N. Y. 5 2*

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A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Pateats in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York. 9

MAGIC TIME OBSERVERS, THE PERFECTION OF mechanism! Being a hunting or open face or lady's or gentleman's watch combined, with patent self-winding improvement.—The New York *Illustrated News*, in its issue of Jan. 10, 1863, on page 147, voluntarily says: "We have been shown a most pleasing novelty, of which the Hubbard Bros., of New York, are the sole importers. It is called the 'Magic Time Observer,' and is a hunting and open face watch combined. One of the prettiest, most convenient, and decidedly the best and cheapest timepieces for general and reliable use ever offered. It has within it and connected with its machinery its own winding attachment, rendering a key entirely unnecessary. The cases of this watch are composed of two metals, the outer one being fine 16-carat gold. It has the improved ruby action lever movement, and is warranted an accurate timepiece" Price, superbly engraved, per case of half a dozen, $204. Sample watches, in neat morocco boxes, for those proposing to buy at wholesale, $35. Sent by mail post paid upon receipt of price. This watch can also be sent by express to any part of the loyal States with bill payable on delivery Soldiers and others in the disloyal States, or any part thereof, must send cash in advance, as we cannot collect from them. Call upon or address HUBBARD BROS., sole importers, 169 Broadway, New York. 1*

TO MACHINISTS AND BOILER MAKERS.—HAVING purchased the patent right of Beckwith's "Ball and Rivet Cutter," for the State of New York, it is now offered for sale in county or shops rights. The patent was granted on March 24, 1863, and the invention is believed to be the best of its kind ever offered for sale. For terms address M. J. VAN DEUSEN, care of HON. ALANSON KNAPP, Alton, Wayne county, N. Y. 1*

WAR DEPARTMENT.

PROVOST MARSHAL GENERAL'S OFFICE,
WASHINGTON, July 20, 1863.

Existing laws make a distinction in the matter of pay, bounty and other allowances, between soldiers of African descent and other soldiers in the service of the United States. Men of African descent can, therefore, only be accepted as substitutes for each other under the Enrolment act.

JAMES B. FRY,
Provost Marshal General.

1

AN ENGINEER COMMANDING A LARGE BUSINESS and some cash capital, is desirous of entering into partnership in a well established machine-shop. Address H. G., care of DR. KENT, 176 Bleeker street, New York. 5 2*

WHITE'S PATENT GOVERNOR AND CHECK VALVE—A perfect regulator of steam, and always safe, as it checks the speed of an engine if the governor belt breaks or comes off, which alone is worth the price of it. Territory for sale. For particulars inquire of A. WHITE & CO., proprietors and manufacturers, Geneseo, Henry county, Ill. 4 3*

LABORATORY OF INDUSTRIAL CHEMISTRY—ADvice on chemistry applied to arts and manufactures, agriculture, metallurgy, analyses, and commercial essays of every kind; plans of factories, chemical fabricateures, recipes, &c. &c. Address Prof. H. DUSSAUCE, chemist, New Lebanon, N. Y. 4 2*

RIGHT FOR THE STATE OF NEW YORK FOR SALE.—Improved Automatic Weighing Scale. This scale operates without the use of weights or springs, is compact, simple and cheap, always reliable, never gets out of order, has every advantage of the spring balance without its disadvantages, and can be adapted to every kind of scale now in use, and is superior to any scale now in use. For terms &c., address as soon as possible L. C. CROWELL, 187 Salem street, Boston, Mass. 3 6*

WATER WHEELS.—REYNOLD'S PATENT.—THE best turbine in use; powerful and economical in use of water Call upon or address us at our office. Works at Oswego.
3 4 TALLCOTT & UNDERHILL, 482 Broadway, New York.

WOOD-WORKING MACHINES.—A FULL SETT for car and sash and door work. Two Woodworth planers 6 rolls, 14 inches. One Gray & Wood planer 16 by 20, one Daniel's planer, one planer and matcher, two molding, two tenoning, and two mortising machines, two scroll saws, one boring machine, two saw tables, one circular saw mill, one "Wicks" re-slatting mill, one cut-off saw, one blind slat machine, belting, &c., all in good order and cheap for cash. Address CHARLES H. SMITH, 135 North Third street, Philadelphia, Pa. 3 4*

MACHINERY.—SLIDE LATHES, IRON PLANERS, upright drills, bolt-cutting machines, milling machines, gear cutting engines, punching machines, universal chucks, &c., at 135 North Third street, Philadelphia, Pa., CHARLES H. SMITH.
3 4*

FOR WOODWORTH'S OR DANIEL'S PLANERS AND Sash Machinery address J. A. FAY & CO., or E. C. TAINTER, proceeding partner, Worcester, Mass. 22 & 25—2 & 5 Vol. 9 *

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JOHN H. CHEEVER, Treasurer. 4tf

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THE UNRIVALLED DOUGLASS ARTIFICIAL LIMBS are adapted and applied to all forms of amputations. Recommended by the leading surgeons; liberally patronized by the U. S Army and Navy officers. Manufactured by F. DeForrest Douglass, Burt's Block, Springfield, Mass. 4 2*

B. T. BABBITT ON MAKING BREAD, WITH FULL directions on each package of Saleratus, showing how to make the best of bread from materials that farmers always have on hand. Bread made in this manner contains nothing but flour and common salt and water; it has an agreeable taste; keeps much longer than common bread; is more digestible and much less disposed to turn to acid. Common bread, like every thing that has been fermented, ferments again to the great discomfort of many stomachs, and not only so, but acting as a ferment, it communicates to all food in contact with it. The bread being free from all yeasty particles, is more digestible and not so likely to create flatulence or turn acid on weak stomachs as fermented bread is apt to do, and, when of the finest quality, it is beneficial to those who suffer from headache, acidity, flatulence eructations, a sense of sinking at the pit of the stomach, distension or pains after meals, and to all who are subject to gout or gravel; it is also useful in many affections of the skin; a saving of 25 pounds of flour per barrel is effected by this process. Be sure and get that with B. T. BABBITT'S name on, or you will not get the recipe with sour milk, nor the quality. For sale by store-keepers generally or at the manufactory, Nos. 64 to 74 Washington street, New York. 25 tf

TO MANUFACTURERS AND MACHINE BUILDERS.—The undersigned being engaged in the purchase and sale of machinery, such as steam engines, mill and factory machinery, lathes, tools, and all kinds of manufactured machines and implements, and assisting commission merchants and others in their purchases, solicits from manufacturers their circulars, price lists, terms, &c., also any illustrations of their machinery or works they may have. Parties introducing new inventions or improvements will find it to their interest to communicate with him, giving such information in regard to their improvements as they deem necessary, which will receive the attention due to their merits. J. E. STEVENSON, Machinery Broker, 200 Broadway, New York. References:—The Novelty Iron Works, New York; Franklin Townsend, Albany, N.Y.; Lowell Machine Shop, Lowell, Mass.; Hunsworth, Eakins & Naylor, People's Works, Philadelphia, Pa. 1 5*

FIBER-CLEANING MACHINE.—THIS VALUABLE machine, the invention of Eduardo J. y Patrullo, and illustrated on page 368, last volume, SCIENTIFIC AMERICAN, is now on exhibition, where the public are invited to examine it, at the establishment of TODD & RAFFERTY, No. 13 Dey street, New York. 2 13

WANTED—SCRAP IRON, OLD BOILERS, AND OLD Iron Machinery.—The subscribers will pay cash for any quantity of Wrought or Cast Scrap Iron, Old Boilers, and Old Iron Machinery, delivered at their warehouse, 28, 30, and 32 Terrace street, Buffalo, or at their Rolling Mill and Nail Factory, Black Rock, N. Y.
Buffalo, July, 1863. PRATT & CO
2 16*

$60 A MONTH! WE WANT AGENTS AT $60 A month, expenses paid, to sell our Everlasting Pencils, Oriental Burners, and thirteen other new, useful and curious articles. Fifteen circulars sent free. Address SHAW & CLARK, Biddeford, Maine. 21 11*

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HOMAN'S "EXCELSIOR" HORSE HAY RAKE.—Those wishing rights in THE BEST, either for manufacture or speculation, should apply immediately. New England States already disposed of. Described in Nos. 22 and 25, Vol. VIII. (new series), of the SCIENTIFIC AMERICAN. Circulars sent free. C. B. HOLMES, Dowagiac, Mich. 25 6*

NERVOUS DISEASES AND PHYSICAL DEBILITY, arising from Specific causes, in both sexes—new and reliable treatment, in Reports of the Howard Association—sent in sealed letter envelopes, free of charge. Address Dr. J. SKILLIN HOUGHTON, Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 3 4*

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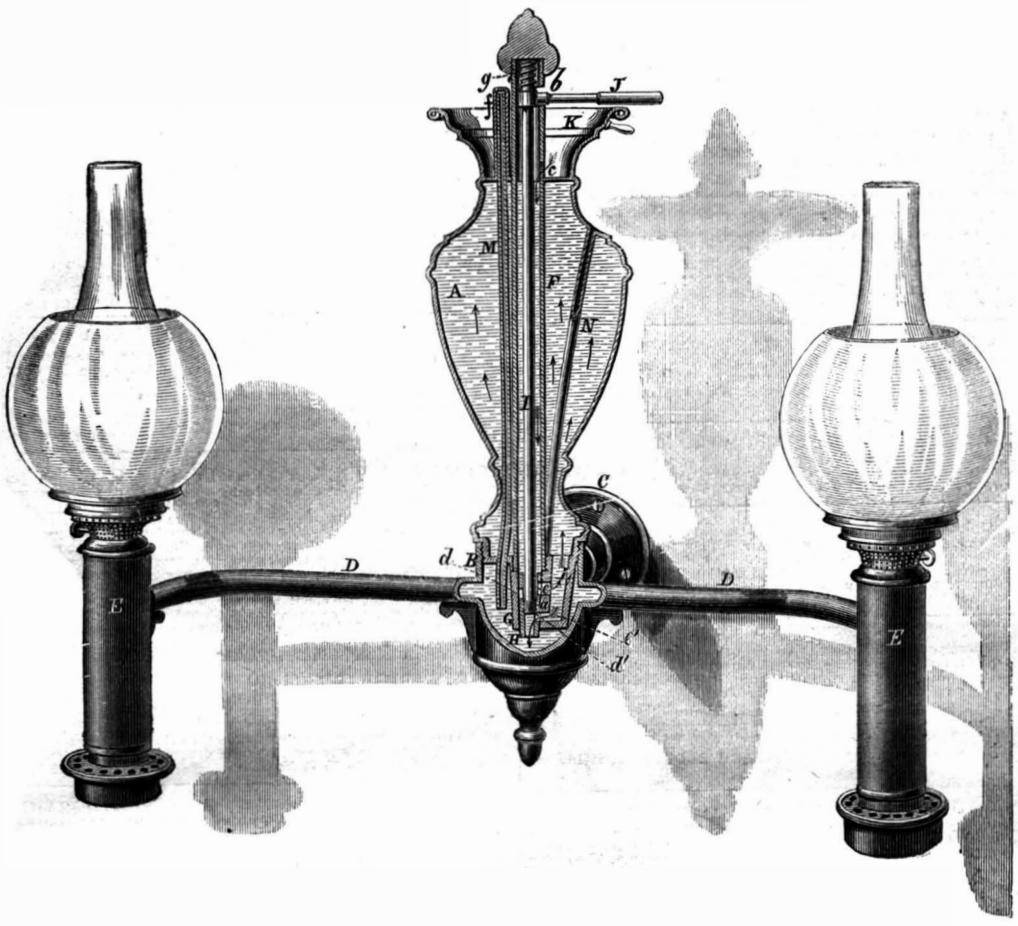
Improved Reservoir Lamp.

The engraving herewith presented is one of a class of lamps that are being gradually introduced to public notice. They possess decided advantages over lamps with burners attached directly to the fountains (as in ordinary ones), for the reason that the supply of oil to the wick is limited or weakened as the quantity decreases, and the light consequently becomes dim. With these lamps the reservoir, directly beneath the burner, is always full; the light is, therefore, clear and steady, and will last much longer without renewal than it does in ordinary lamps. When the lamp requires to be re-filled it can be easily done without removing chimneys, globes, or other appurtenances, and the flame need not be extinguished to perform the office. The detailed description herewith appended will enable the reader to very clearly understand the philosophical principles on which the lamp works.



SEAMAN'S PATENT RESERVOIR LAMP.

In Fig. 1, A represents the fountain of the lamp, screwed into the cup, B, attached to the bracket, C, and having a tube, D, communicating with it; this tube connects at its outer end with a small chamber, E, in the upper end of which the usual burners and globe are attached. It will be seen that the large fountain is elevated materially above the level of the burner, and that it has a tube, F, fastened securely in its center, in the lower end of which the conical socket, G, is fastened; in this socket the valve, H, is fitted and allowed to turn freely by means of the rod, I, and the handle, J, working through the slot, *b*, in the top of the tube. The valve has a partition, *a*, in which the rod is fastened. On the upper part of the fountain is the chamber, K. This chamber communicates at the bottom with the tube, F, through the opening, *c*; the valve, H, has also two holes, *d d'*, one above and the other below the partition. These openings are on opposite sides of the valve, and the socket, G, has also two holes, *e* and *e'*, one directly over the other and in line with the holes *d* and *d'*. The apertures, *e e'*, form a communication with a small chamber, L, adjoining the socket, G, which communicates at the top with the main reservoir. The tube, M, is fitted into the fountain and extends down a certain distance into the cup, B; the upper part of the tube rises above the top of the fountain, and is enclosed by a case, *f*, the lower end of which opens into the fountain. The tube, N, passes quite through the fountain and opens a communication between the cup, B, and the atmosphere. On the upper part of the valve rod, I, there is a spring, G, which keeps the valve, H, in its place. These are the principal details of this apparatus; the operation is as follows:—

The fountain, A, is filled with oil by turning the valve, H, so that the hole, *d*, will be in line with the aperture, *e*, the other holes being of course out of line with each other. When the valve is in this position, a communication between the fountain, K, and the tube, F; all communication between A and B is cut off. When the oil is poured into the funnel, K, it runs down the tube, F, through the opening, *c*, and the holes, *d* and *e*, into the valve and socket and up through the chamber, L, into the fountain, A, as indicated by the arrows. When the fountain is full, communication between the holes, *d* and *e*, is cut off by turning the handles, J; this act brings A and B into connection with each other, so that the oil will flow into the tube, D, and up to the burner in F. The oil will run down from A to B until it covers the lower end of the tube, M, the flow will then cease in consequence of the atmospheric pressure being removed from the upper end of the reservoir. When the lower end of the tube, M, is open, the air in B, above the oil, passes up through the tube, M, into the upper part of the chamber, A, while B is supplied with air through the tube, N. As the oil is consumed in E, the level of it falls in B, and when the lower end of the tube, M, is left free, the air will rush up through it and cause a flow from A to B. Thus it will be seen that the wicks in E are constantly supplied with oil so long as there is any in the fountain. There is no possibility of the oil overflowing; the whole apparatus being self-acting, except so far as filling the reservoir primarily. The oil in the chamber, A, cannot escape without a pressure of air on its upper surface, and this cannot occur when the lower end of the tube, M, is immersed; the tube, M, also permits the air to escape when the fountain is to be filled.

These lamps, are, we are informed, selling quite rapidly, notwithstanding the short time they have been in the market, and they give the fullest satisfaction to all who have used them. Any number of branches for burners can be furnished, from one to forty and one, or a larger number still if required.

The patent for this invention was procured through the Scientific American Agency, on June 9, 1863, by John H. Seaman, 14 Meserole street, Brooklyn, N. Y., and further information can be had by addressing Fellows, Hoffman & Co., No. 74 Beekman street, New York.

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